SEPTEMBER 12, 1936

Railway Age

Founded in 1856

McCARTNEY
GENEVA COLLEGE

UP AND DOWN THE AISLES WITHOUT A STAGGER

It is easier to walk about in a modern high speed train going ninety miles an hour than in an old type train at half that speed. Many a timid traveler in the past has gone hungry rather than run the risk of embarrassment in walking through the train to reach the diner.

But that's all over now. With Timken Bearings on the axles, the sleek streamlined speedsters of today ride so smoothly and steadily that any passenger can negotiate the aisles with confidence and poise.

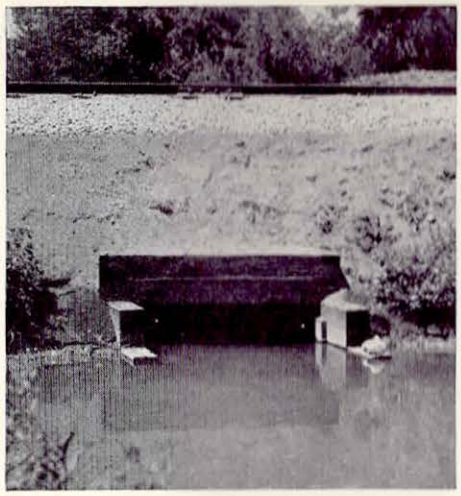
There is little or no sidesway; no lurching or jibbing of vestibules. The car floors feel as level and firm as the hardwood at home. These are the trains—Timken-equipped as well as air-conditioned—that are largely responsible for the remarkable and spectacular revival of passenger transportation on American railroads. These are the trains for which the traveling public will continue to show its preference by its patronage. It pays to operate them.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

The Union Pacific's new "City of San Francisco" and "City of Denver" are both Timken-equipped.

TIMKEN TAPERED ROLLER BEARINGS

FOR PERMANENT ECONOMICAL RAILWAY DRAINAGE



Many of the larger Railroads have given serious consideration to the problem of proper drainage for railway roadways and have undertaken a comprehensive drainage program. This program is nation-wide and the economies effected are reflected in savings of millions of dollars in expenditures for track surfacing.

Pressure Treated Timbers offer a material that is dependable and economical and provide maximum service life with a minimum original cost and annual maintenance expense. "Wood Preserving" superior timber products, pressure treated according to the best standard practices with highest quality preservatives, are your assurance of value and service.

THE WOOD PRESERVING CORPORATION
KOPPERS

THE WOOD PRESERVING CORPORATION
KOPPERS BUILDING . . . PITTSBURGH, PENNA.

SALES OFFICES
Baltimore, Md.
Boston, Mass.
Charleston, S. C.
Chicago, Ill.
Denver, Colorado
Houston, Texas
Kansas City, Mo.
Memphis, Tenn.

AYER & LORD DIVISION CHICAGO, ILL.
CENTURY DIVISION PITTSBURGH, PA.
CAROLINA WOOD PRESERVING CO. CHARLESTON, S. C.
NATIONAL LUMBER & CREOSOTING CO. TEXARKANA, ARK-TEX.

SALES OFFICES
Montgomery, Ala.
New York, N. Y.
Philadelphia, Pa.
Pittsburgh, Pa.
Reed City, Mich.
St. Louis, Mo.
Superior, Wis.
Texarkana, Ark.

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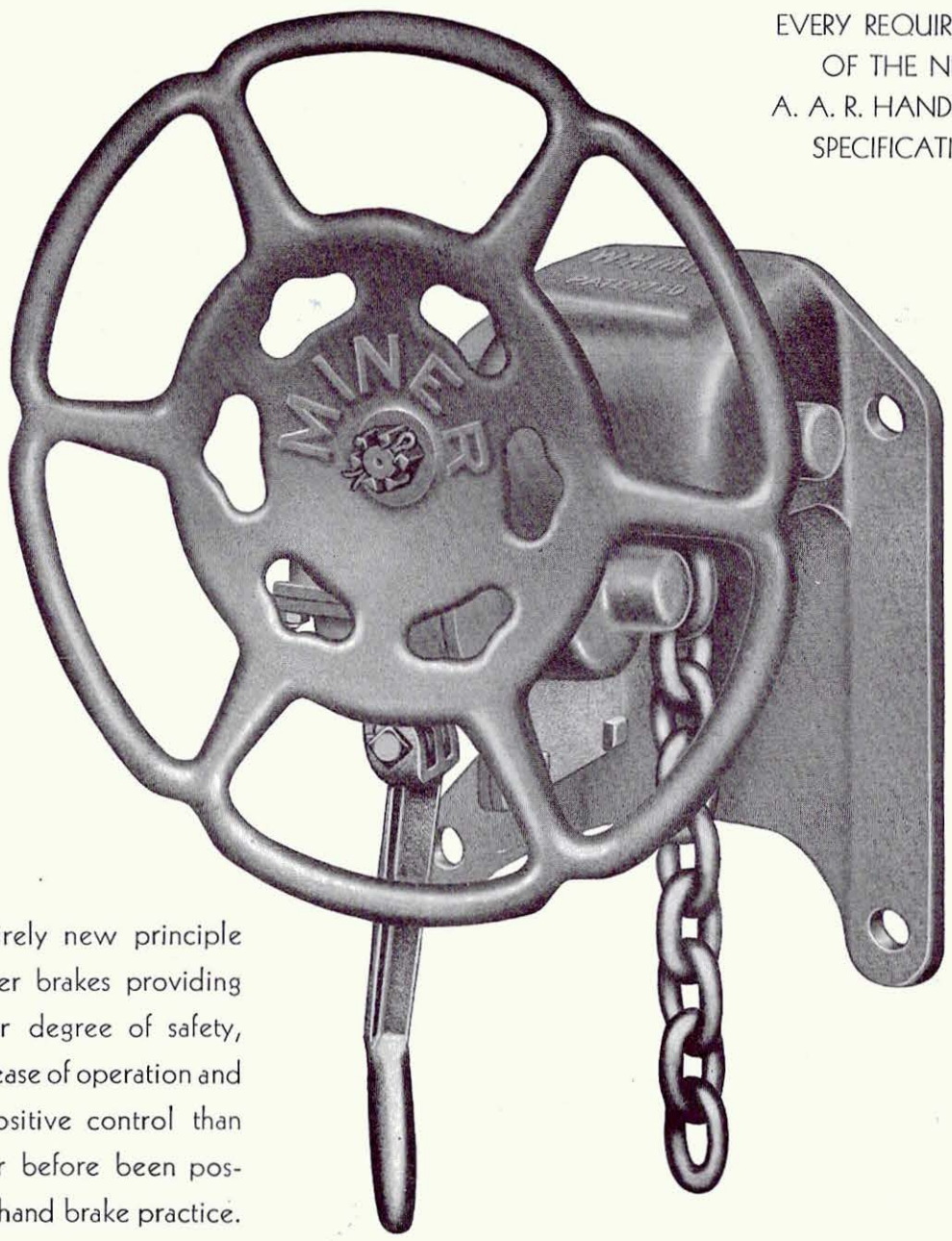
MINER

POWER HAND BRAKE

MEETS
EVERY REQUIREMENT
OF THE NEW
A. A. R. HAND BRAKE
SPECIFICATION

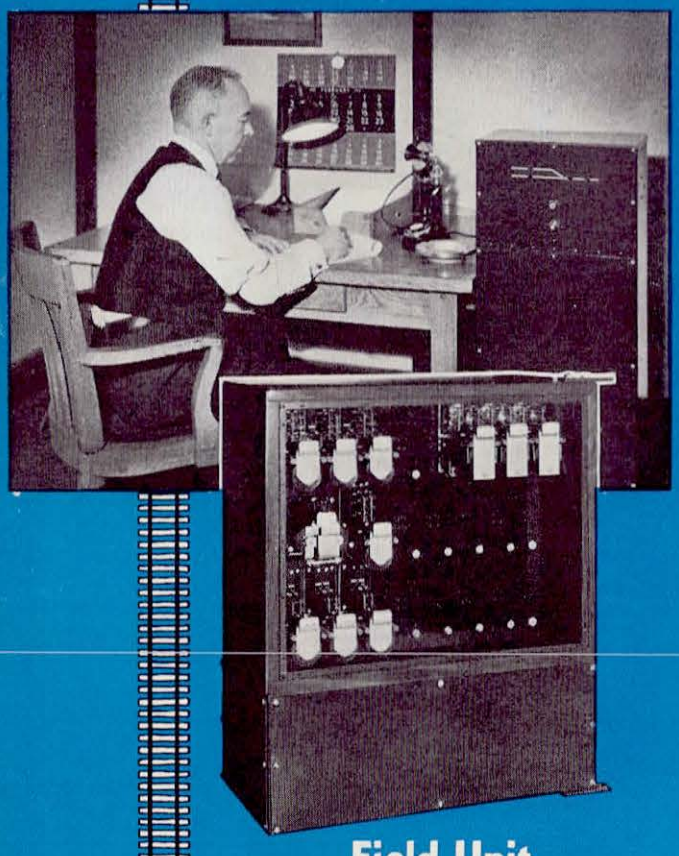


An entirely new principle in power brakes providing a higher degree of safety, greater ease of operation and more positive control than has ever before been possible in hand brake practice.

W. H. MINER, INC. CHICAGO

At that single track

Control Office Unit



Field Unit

you can now cut the cost of train operation and increase the ease of handling trains with the G-R-S CODED REMOTE CONTROL SYSTEM, designed to control a switch and associated signals from a distant office, or tower.

Consider G-R-S Coded Remote Control

junction....

At the tower or control point, one compact unit is connected to the line and battery wires. With the exception of the battery and its charging equipment, this unit contains all the control equipment, including a track diagram, with control levers, and indicator lights.

In the field, one small, compact unit is connected to the line and battery wires, and local relays. This unit contains all the coded remote equipment, including the "application relays" for controlling the switch and signal apparatus.

Both units are factory-wired and tested ready for service, thereby saving time and cost in installation.

Then too, should that single track junction be later absorbed into a Centralized Traffic Control System, these two units, because they contain the least equipment required for the control of one switch and associated signals, could be transferred and used to control some other outlying junction. The rest of the apparatus becomes a part of the $\overline{cTc}$ System.

Our nearest district office will gladly explain the flexibility and economy of this system.

GENERAL RAILWAY SIGNAL COMPANY

New York Chicago ROCHESTER, N. Y. St. Louis A-1334

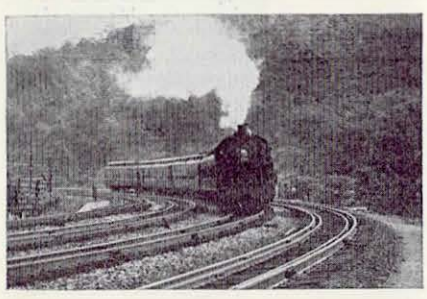
ACCESSORIES that make and more rugged for heavy traffic

PRESENT trends in railroading bring track maintenance much to the fore. The increasing use of high-speed light-weight equipment dictates new standards of smoothness. At the same time the drastic increase in freight-train speeds brings multiplied wear and tear.

The Bethlehem Track Accessories mentioned here are designed and built for these conditions. Adjustability is provided where this will aid in keeping track tuned up to streamline standards. Materials have been selected to provide the ultimate in strength, while in many cases resilience takes the sharp edge from impacts. Write for literature on these Bethlehem Track Accessories.

Bethlehem Gage Rod *stabilizes the rail at curves.* Bethlehem Gage Rods are the effective means of balancing the extra-severe thrusts at curves and switch points resulting from greater speeds.

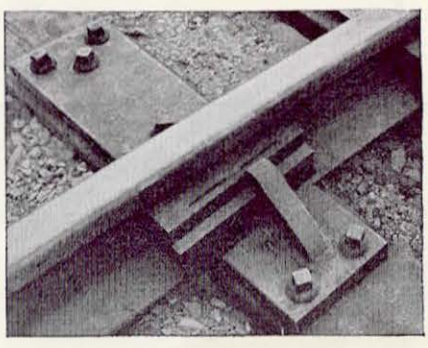
These gage rods distribute the thrust over both rails at curves and hold the rails to gage.



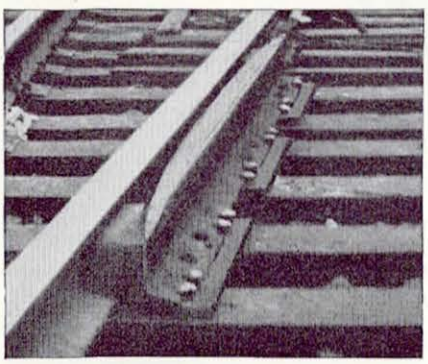
The use of Bethlehem Gage Rods will be found to be an effective means of holding track in the precise alignment needed for fast light-weight equipment.

Bethlehem Spring Rail Brace *provides effective, resilient bracing at turnouts.* The Bethlehem Adjustable Spring Rail Brace securely anchors rails against side thrusts at turnouts. It yields slightly under impact, cushioning shocks, and recovers instantly. The adjustable feature simplifies the work of holding track accurately in position.

This rail brace is of two-piece construction—a combined switch plate and brace and a spring wedge. It is easily installed and readily adjusted in steps of $\frac{1}{16}$ in. by means of a pawl and slot arrangement, the only tool required being a hammer. The spring, besides providing the resilience to absorb impacts, maintains constant pressure on the rail, preventing vibration from loosening the wedge.



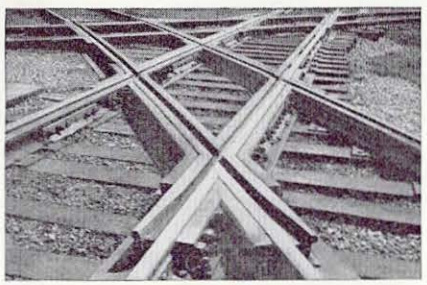
Bethlehem Hook-Flange Guard Rail *cushions shocks—spares wheel flanges.* The Bethlehem Hook-Flange Guard Rail straightens up fast-moving



trucks without great shock, saving wear and tear on both guard rail and wheel flanges.

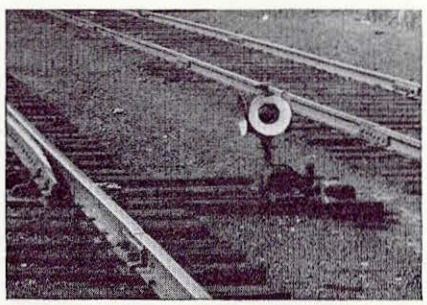
The rolled-steel construction of this guard rail fits it exceptionally well for today's severe service. It yields slightly when struck, dissipating the impact. This guard rail is the safe one for high-speed main-line track.

Bethlehem Heat-Treated Crossings *reduce maintenance.* Bethlehem Heat-Treated Crossings were developed to meet the needs of railroading today. Made of heat-treated rolled steel, these crossings have the combined strength and resilience needed to stand the pounding of the many fast-rolling wheels encountered nowadays.



These crossings effectively lower maintenance expenses especially wherever traffic conditions are rigorous.

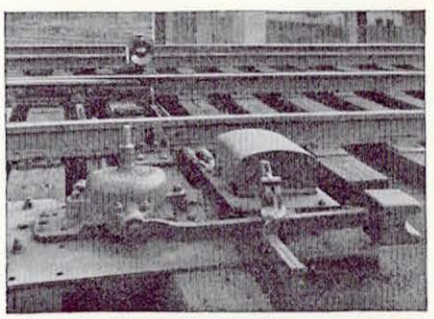
The New Century Switch Stand *measures up to requirements for the heaviest main-line switches.* The New Century Switch Stand is built to a design proved fundamentally sound through service on leading railways over a period of more than forty years. It has been continually strengthened and improved as the



demands upon switch stands have become more severe. Parts made of heat-treated alloy steel provide rugged strength well ahead of present-day requirements.

For other kinds of service

Bethlehem makes other switch stands equally well suited to their fields of service. Among them is Model 1222, an ideal stand to use in yards where sorting and train-makeup requirements call for a stand that can be operated quickly and easily.

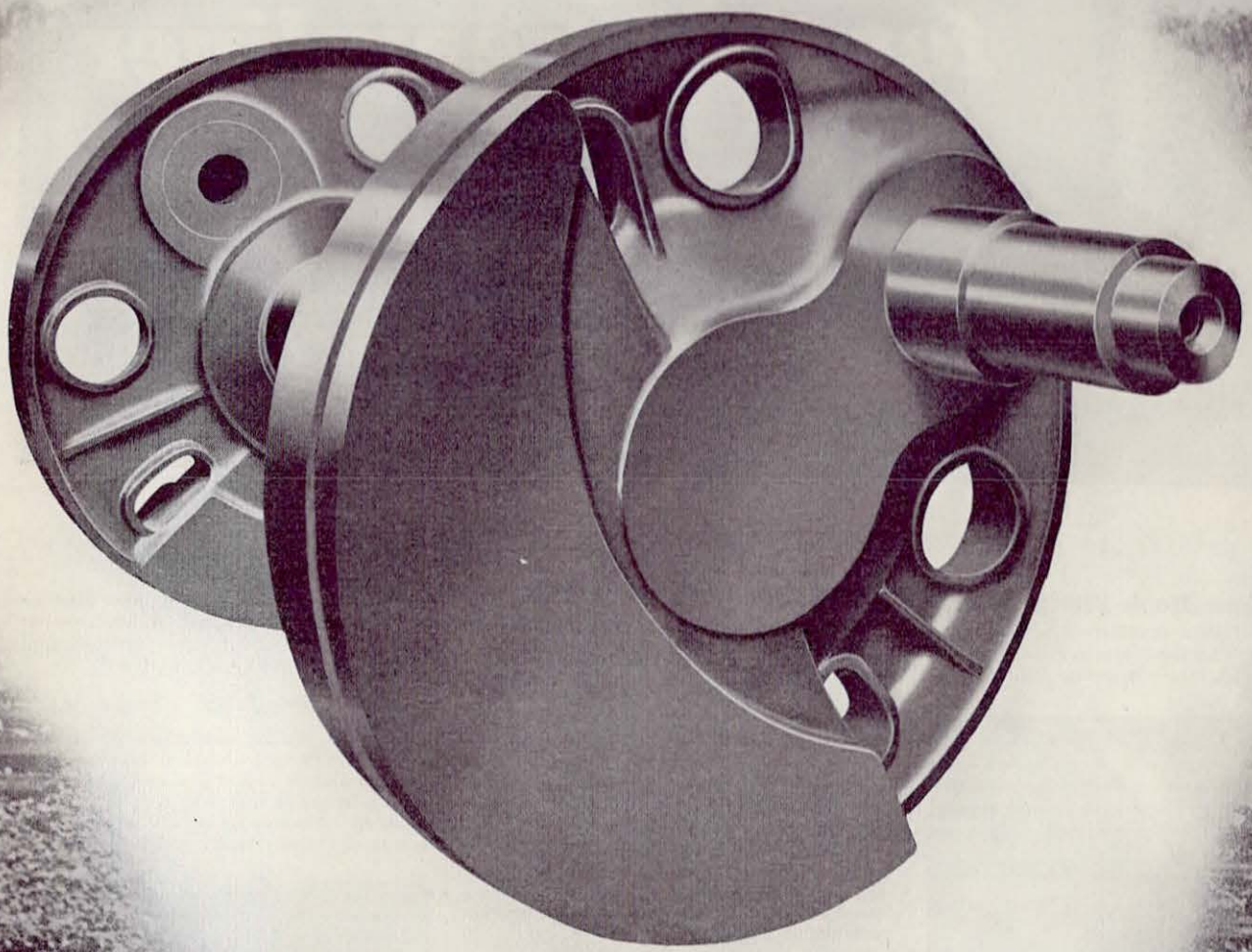


Bethlehem Positive Signal Stand *brings an added degree of safety.* This safety device hooks up the switch points with a distant signal to give warning of any dangerous conditions at the switch.

For today's speeds the Bethlehem Positive Signal Stand is a highly desirable supplement to railroad signal equipment. With this stand any switch in track-circuit territory, however remote, can be made as safe as one controlled from an interlocking plant.

BETHLEHEM STEEL COMPANY

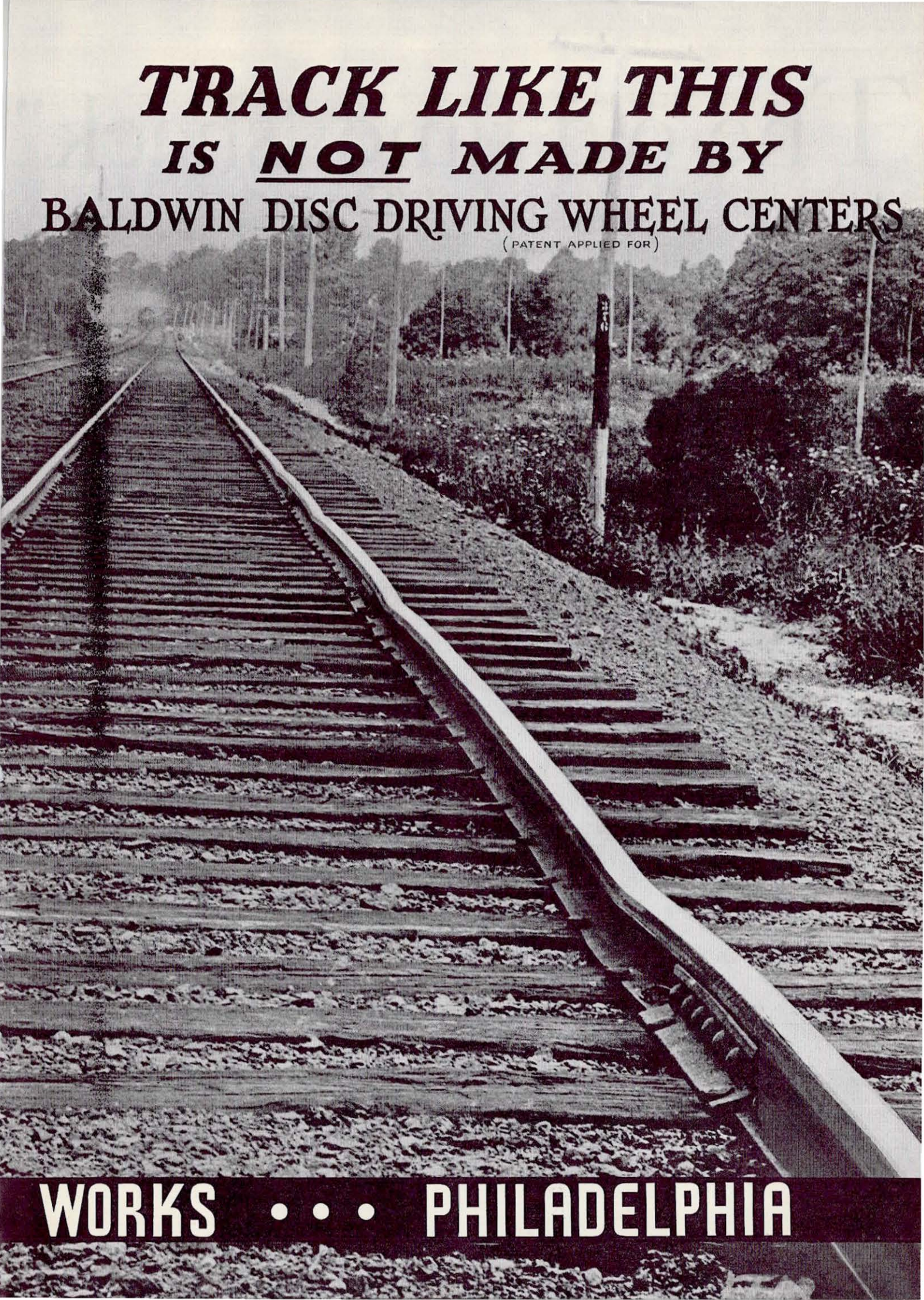
BETHLEHEM STEEL



By substituting these 50" Baldwin Disc Driving Wheel Centers for the conventional type, the weight producing dynamic augment was reduced from 1098 to 387 pounds in each wheel.

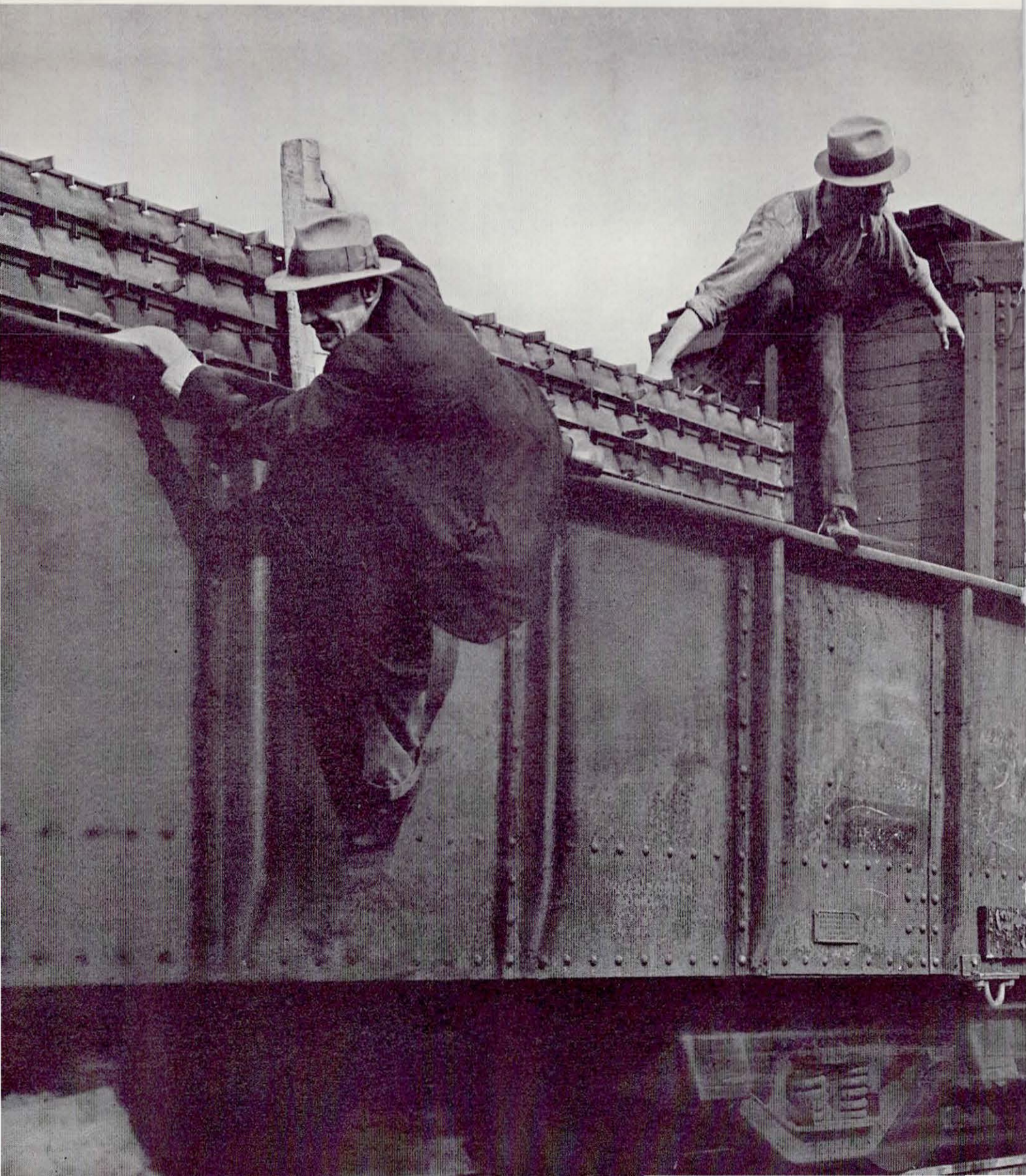
THE BALDWIN LOCOMOTIVE

TRACK LIKE THIS
IS NOT MADE BY
BALDWIN DISC DRIVING WHEEL CENTERS
(PATENT APPLIED FOR)

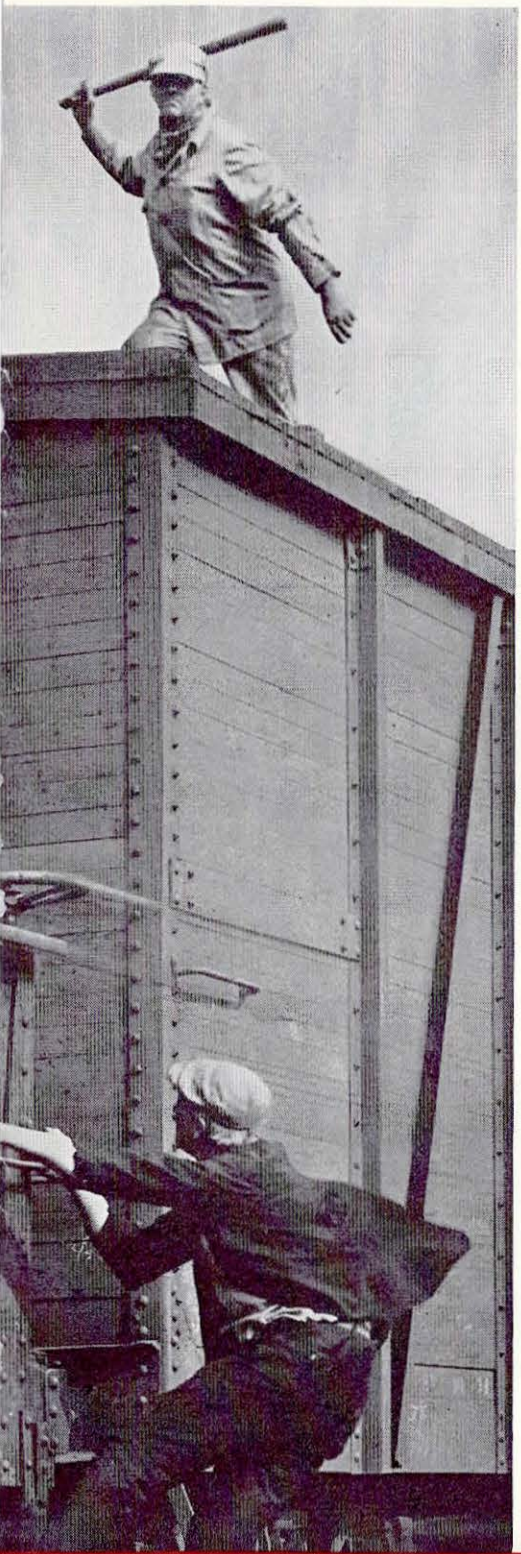


WORKS • • • PHILADELPHIA

The old time "shack"



had the Right Idea



Non-paying "load" stole no rides on his train if he could stop it

BUT what about dead weight? This load still rides free on trains today — still adds its unnecessary burden to hauling costs.

The drag of every ton of excess weight in freight equipment costs approximately $18 per year. This is an average figure — it runs higher in many cases. But whether it is $5 or $50, the total runs into staggering amounts. Why not get rid of it?

Today on every Class 1 road there are thousands of freight cars that should be replaced to meet modern traffic needs. It is in this type of equipment that dead weight elimination will produce the greatest returns. A ton of pay-load can be added for every ton of dead weight removed. Equipment lighter in weight reduces cost and adds to revenue, a two-fold service.

USS COR-TEN and other USS High Tensile Steels offer an opportunity for saving 20% or more in car weight. They have increased the revenue capacity of 50-ton hopper cars by 4 tons, *with no sacrifice in strength.* Because of the toughness and corrosion-resistance of USS COR-TEN, this lighter equipment will endure.

To learn how well USS COR-TEN and other USS High Tensile Steels fit into your rehabilitation and modernization program — how little they increase costs or affect shop practice, address Railroad Research Bureau, United States Steel Corporation Subsidiaries, Frick Building, Pittsburgh, Pa.

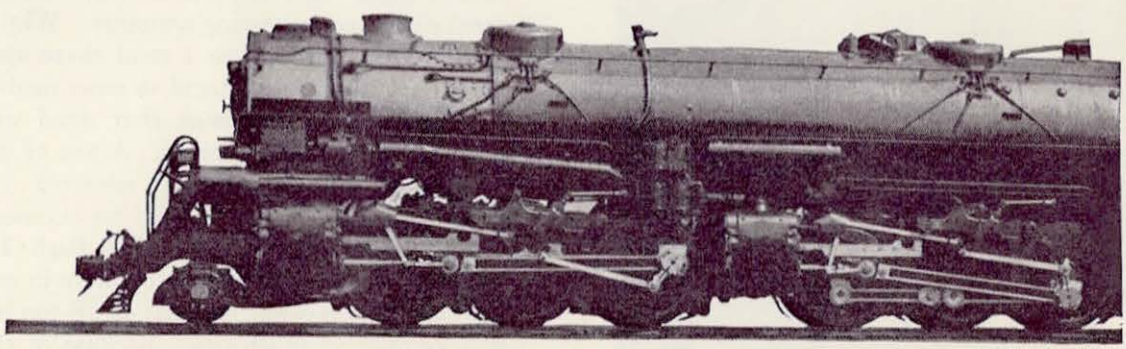
AMERICAN STEEL & WIRE COMPANY, *Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

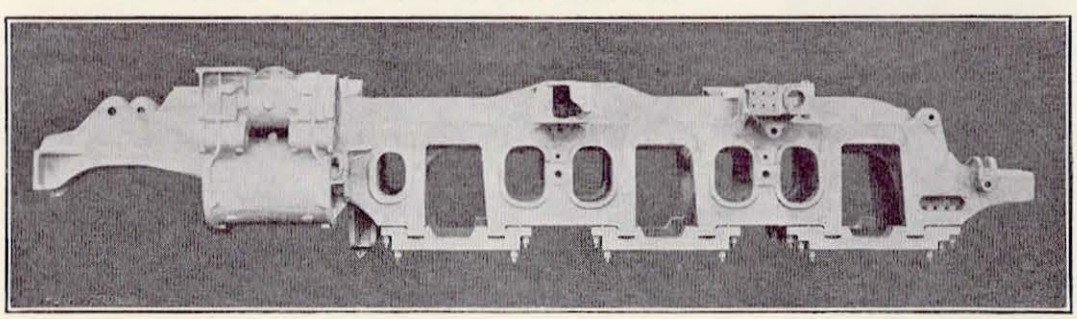
COMMONWEALTH

Cast Steel Products

On this locomotive Commonwealth one-piece beds, outside-bearing engine truck, Delta trailer truck, six-wheel tender trucks and water-bottom tender frame are used.



70" Drivers 24"x30" cylinders Wt. on Drivers 430100 lbs.

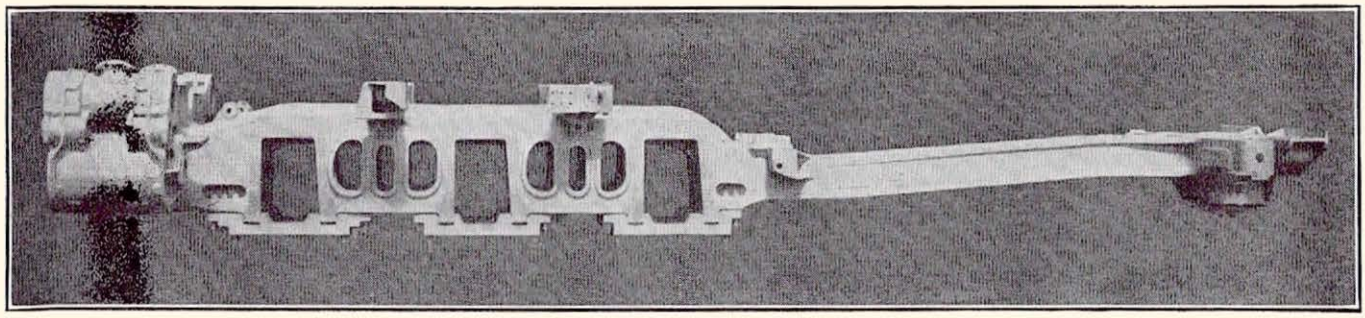


One-piece Bed for Front Unit

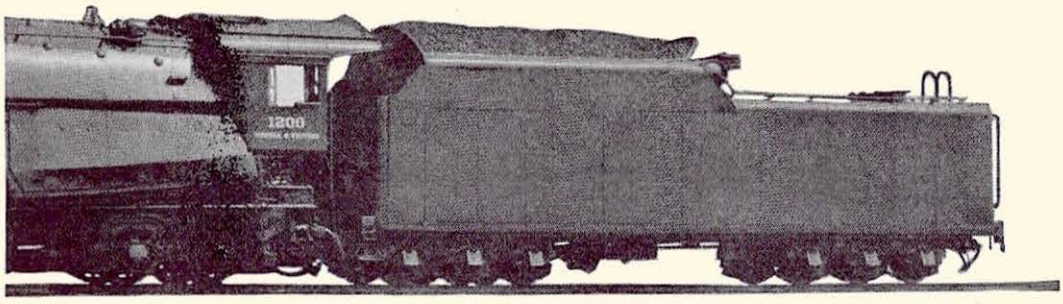
INTEGRAL CYLINDER BED, A STRONG SINGLE UNIT, REPLACES MANY PARTS AND MACHINE-FITTED BOLTS AND ELIMINATES A LARGE PORTION OF USUAL LOCOMOTIVE REPAIR COSTS.

NORFOLK AND WESTERN

blazes the trail in freight transportation with powerful high-speed locomotives built for maximum availability and lowest maintenance.



One-piece Bed for Rear Unit



Tractive power 104500 lbs. 300 lb. steam pressure. Single expansion.

COMMONWEALTH PRODUCTS
INSURE MAXIMUM AVAILABILITY
AND LOWEST MAINTENANCE.

GENERAL STEEL
CASTINGS CORPORATION
Granite City, Ill. **Eddystone, Pa.**

WHY IS THIS THE SAFEST FORM OF TRAVEL?

You already know that the record of the railroads proves no other form of transportation can equal them in safety. Now add this impressive fact: Budd-built light-weight stainless-steel trains increase the safety factor in railroad operation!

Increased safety was one of the original objectives in the development of Budd-built trains. This objective was accomplished by the use of the new chrome-nickel alloy known as stainless steel—made practicable through the use of "Shotweld." Non-corrosive, stainless steel has four times the elastic strength of ordinary steel.

As a result of Budd methods of construction, the stainless-steel trains that are revolutionizing railroad transportation are homogeneous shells of virtually indestructible stainless steel! Free from vibration and with a low center of gravity, they hold the rails remarkably well, are easy on the track, quick to accelerate and easy to brake.

By March, 1936, Budd-built trains had completed 1,000,000 miles of safe and profitable operation. Every phase of their operation has been tested and subjected to keenest analytical study.

Do the results show that such trains will eventually take the place of passenger trains now in operation?

That will depend upon management and the special problems and requirements of individual railroads. Budd-built trains have not only proved they are safer, faster, more durable, more economical and more profitable—but that they also attract passengers in ever-increasing numbers away from competing forms of transportation.

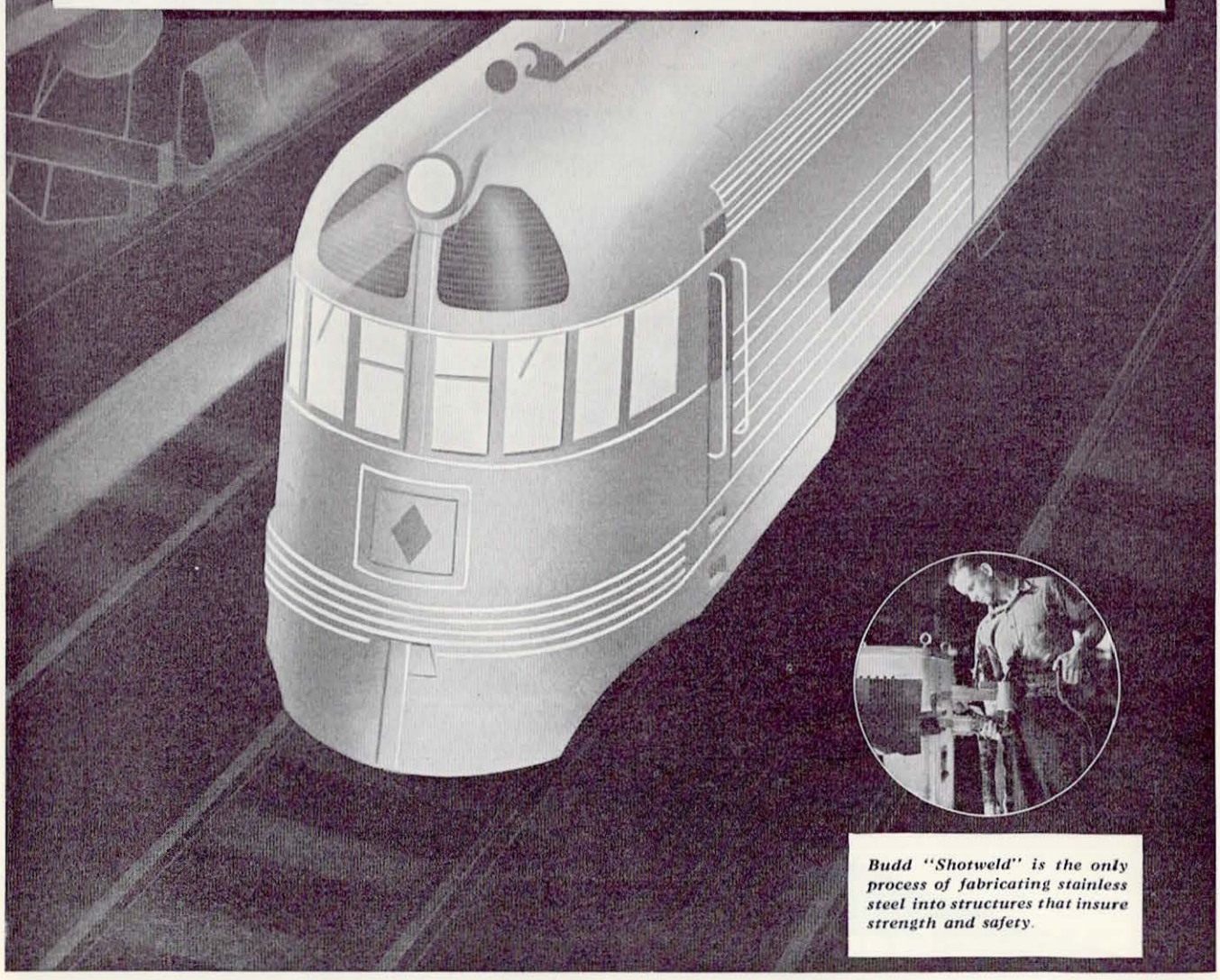
Budd-built trains are a solution to many of the pressing problems of railroad operation. Through structural design and safe elimination of dead-weight, they have been able to show reductions in operating costs as high as 49%.

"The Conquest of Weight", an important brochure on Budd methods of construction will be mailed on request.

EDW. G. BUDD MANUFACTURING COMPANY

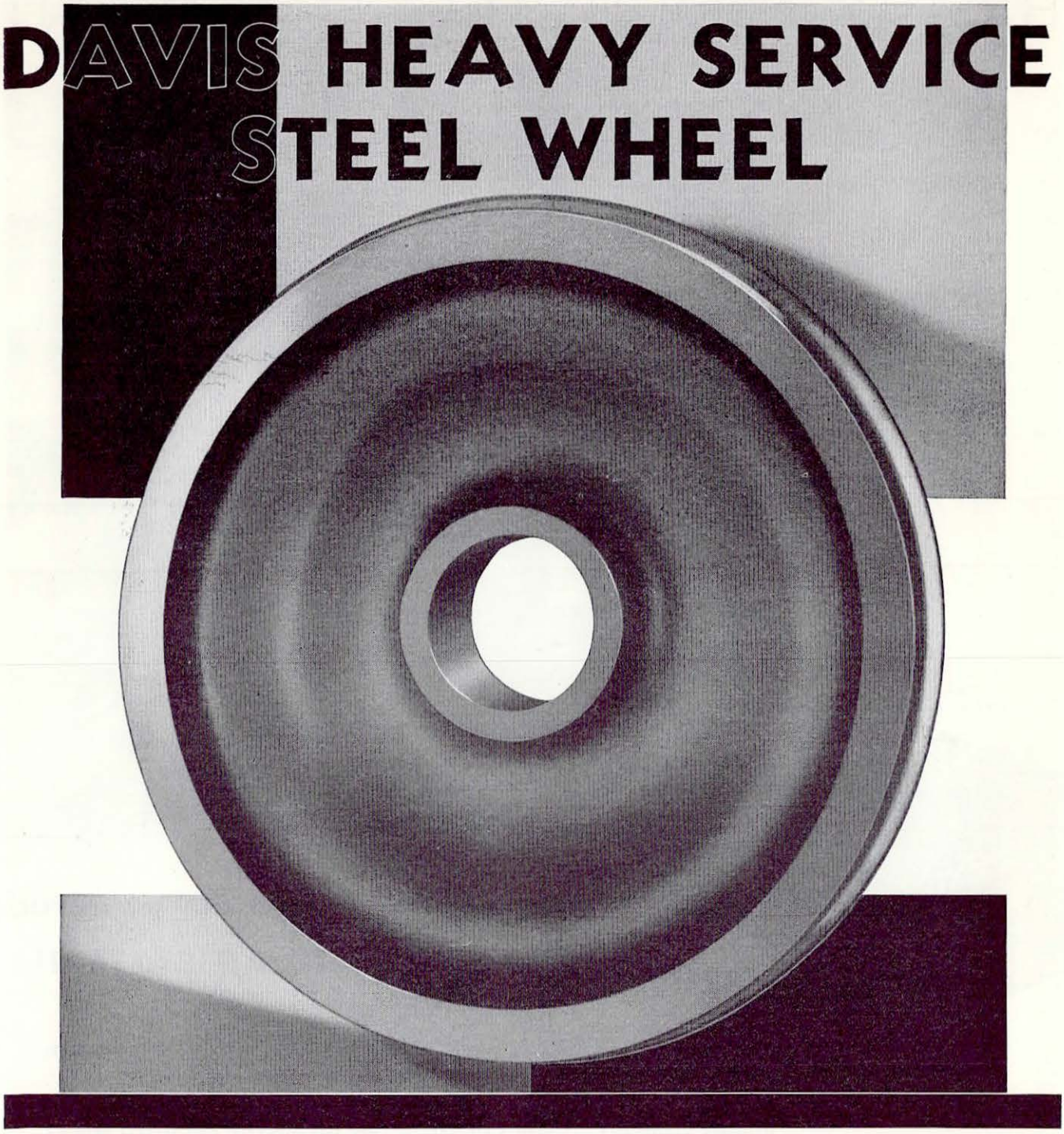
RAILWAY DIVISION, PHILADELPHIA

BUDD METHODS SAFELY ELIMINATE DEAD-WEIGHT



Budd "Shotweld" is the only process of fabricating stainless steel into structures that insure strength and safety.

DAVIS HEAVY SERVICE STEEL WHEEL



A multiple wear wheel for tender service.

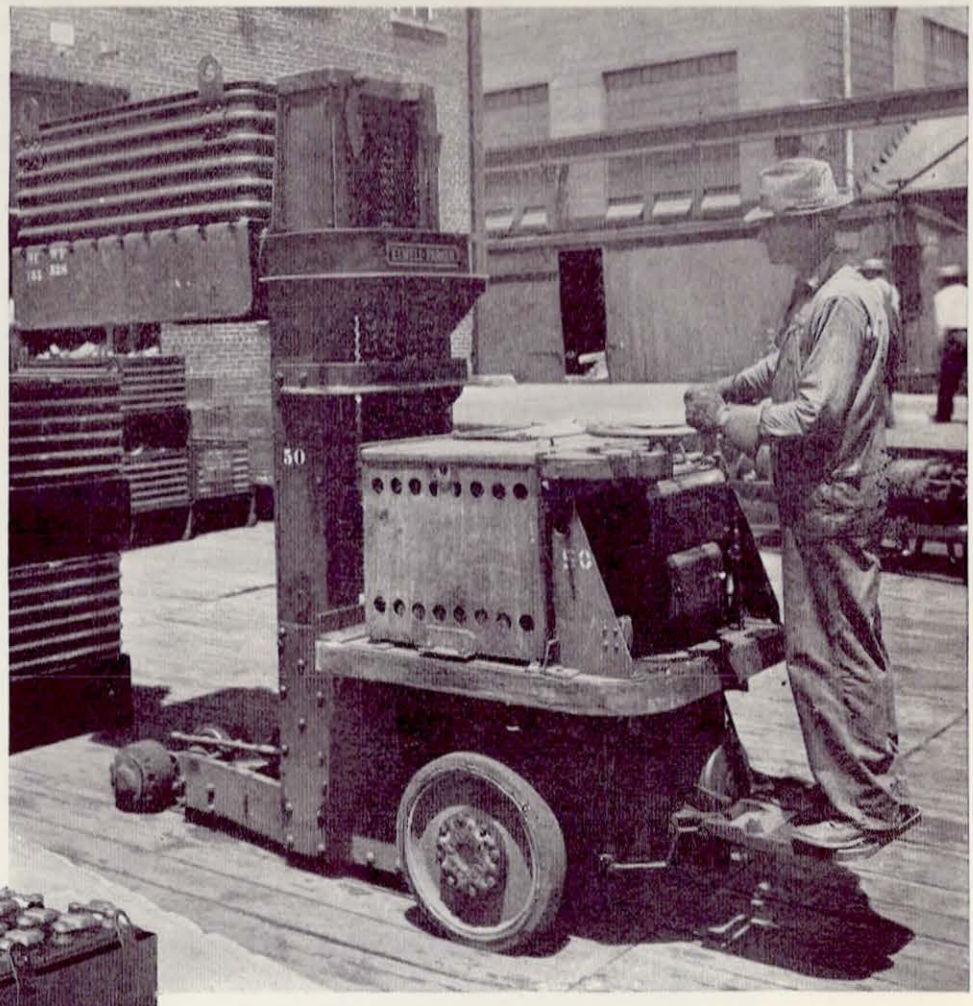
A wheel made of special composition steel, heat treated to produce a hard, tough, high tensile wear resisting tread.

A wheel that will practically eliminate shell-outs, brake burns and other tread disintegration defects caused by the heavy wheel loads and high speeds of modern locomotive tenders.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

HIGHLY PRODUCTIVE EQUIPMENT



Truck illustrated made by
The Elwell Parker Electric Company

Electric industrial trucks powered by EXIDE-IRONCLAD BATTERIES

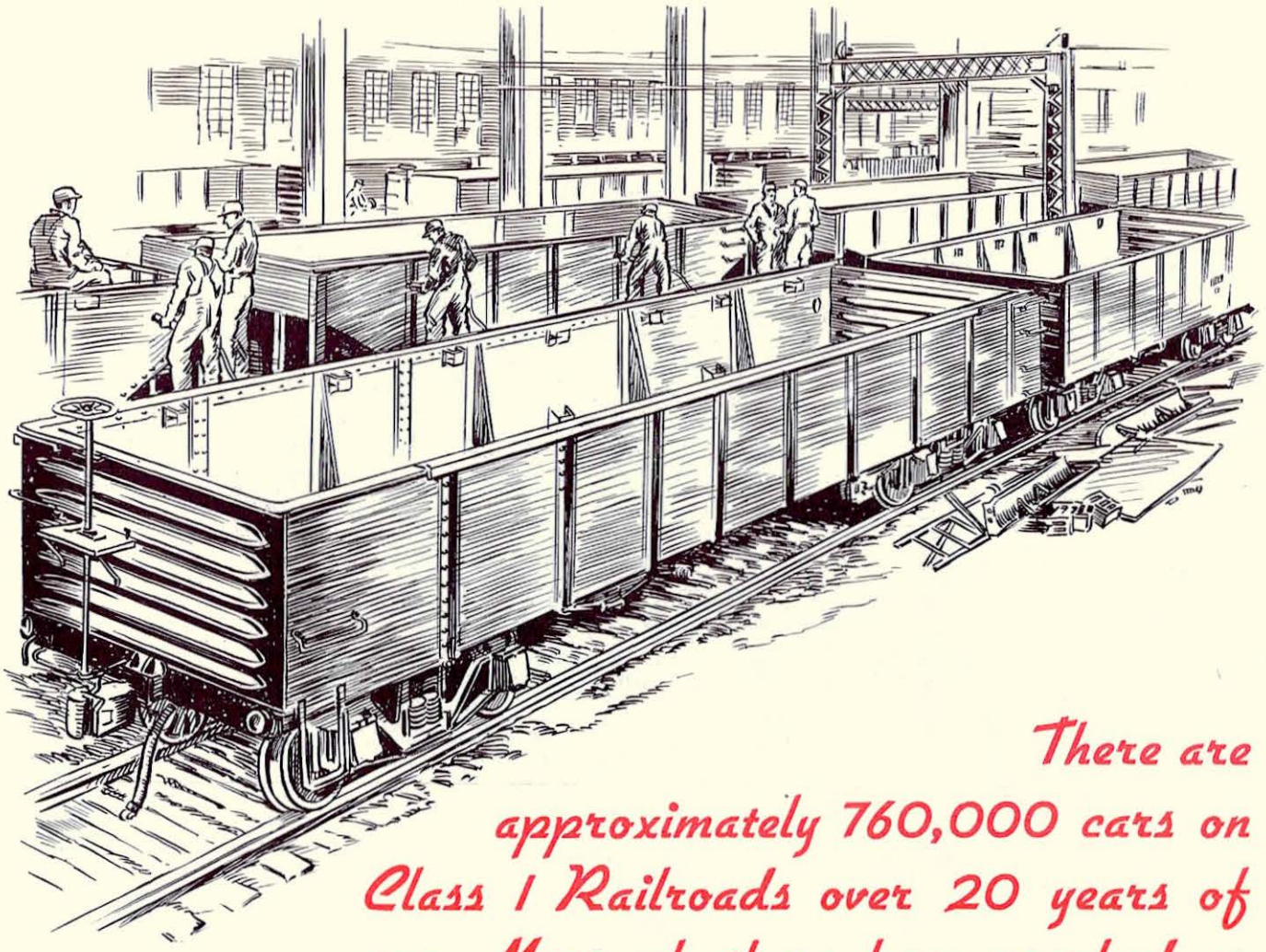
WHEN it is important to save time . . . when unexpected delays might prove costly . . . when it is necessary to handle materials both dependably and with utmost economy . . . you can safely rely on electric industrial trucks equipped with Exide-Ironclad Batteries.

Almost unlimited power is available, along with uninterrupted service throughout the day. And no method of handling material is safer . . . more flexible . . . more fully equal to the needs.

Exide-Ironclad Batteries, because of their high power ability, sustained voltage, dependability and long life, as well as ease and low cost of maintenance, can improve your material handling service and cut costs. Write for free booklet, "The Efficient, Economical Method of Handling Material."

Exide
IRONCLAD
BATTERIES
With Exide MIPOR Separators
"MIPOR," Reg. U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto



There are approximately 760,000 cars on Class I Railroads over 20 years of age. Most of these have reached or are approaching the point where they must be rebuilt or replaced.

In addition to the $21,000,000. per annum saving considered possible on box cars alone, Coverdale & Colpitts in their report on the "Economic Aspects of the Freight Car Situation" make the following statement regarding additional possible savings on open top cars.

Car building companies would welcome the opportunity to present to any railroad analysis to show the economy of replacing obsolete cars with new ones. Worthwhile and immediate savings are assured.

"Although comparable costs of rebuilding open top cars are not available in detail, such information as we have indicates that substantial savings would result by the purchase of new cars rather than rebuilding old cars. There are approximately 320,000 open top cars more than 20 years old. As of January 1, 1936 there were 137,000 open top cars in bad order, of which 119,000, or 87 per cent, were awaiting heavy repairs."

American Railway Car Institute

19 Rector Street New York, N. Y.

Railroad Jim
THE COLUMN CONDUCTOR Says . . .

People are patting us on the back.

They like our air-conditioned trains. They like our lower fares. They like our safety record. They like our faster schedules. And they like our equipment.

I don't mean only the new streamline trains. Those are fine, and I'll be glad when I get to run on one of them. But what I mean is the standard equipment. It makes a hit with people after they have been touring and detouring in crowded smaller conveyances.

I hear more people talking about railroads on one trip nowadays than I used to hear in ten. And in a better spirit. Used to hear a lot of kicks. Now I hear a lot of bouquets.

A lot of people say they didn't realize that Western Railroads and allied industries gave employment last year to 750,000 people. I'm glad we told the public about that, and how the railroads are home industries. Every town I ever was in likes to get more railroad workers, and lately I see in the papers what it means to the old home town when railroad business is good.

It ought to be good. We give the finest transportation in the world, both freight and passenger, at the lowest rates. When you travel by train you're safe and comfortable. When you ship by train you're also safe because you know the railroad will get the goods through hell and high tide, on time, and if anything should happen, the railroad will stand responsible.

Folks have found out how to figure the real cost of transportation. That's one reason so many are using the railroads again.

I sometimes wonder if all the thousands of people who work in allied industries go out of their way to boost railroad transportation. They ought to. If I owned a business that sells its products to the railroads you can bet I would ask every man and woman on the payroll to travel by train. Because when railroad business is better other industries can sell them more commodities and that means more steady jobs.

Personally, I'm proud of the way Western Railroads are telling the public what we've got to offer.

. . . *Railroad Jim*

WESTERN RAILROADS

and THE PULLMAN COMPANY

Burroughs

IMPROVE YOUR PAYROLL ACCOUNTING

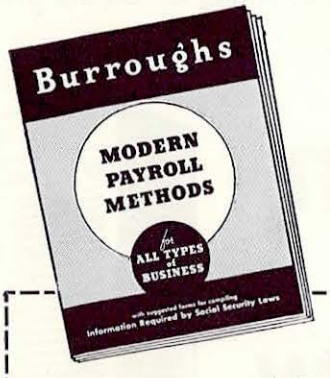
and at the same time obtain the information required by the

SOCIAL SECURITY ACT

Many employers are finding in recent Burroughs developments a simple solution of the accounting problems set up by the Federal Social Security Act. Often the exceptional speed, ease and economy of new Burroughs machines make it possible for employers actually to lower accounting costs and still have the additional information required.

In fact, many say: "We are glad the Social Security Act prompted us to investigate, because we now have the complete payroll accounting system we have needed for a long time."

We suggest that you call the local Burroughs office. A Burroughs representative will be glad to show you how we can assist you to meet your problem with the minimum change in equipment, and at the lowest possible accounting cost.


Burroughs
MODERN PAYROLL METHODS
for ALL TYPES of BUSINESS
with suggested forms for compiling Information Required by Social Security Laws

THIS NEW FOLDER MAY HELP YOU

Burroughs has just prepared an interesting descriptive folder illustrating complete payroll accounting methods, with typical forms for maintaining the information required by the Social Security Act. The forms show representative entries and suitable column headings. You may have this folder without charge simply by filling in and mailing the coupon.

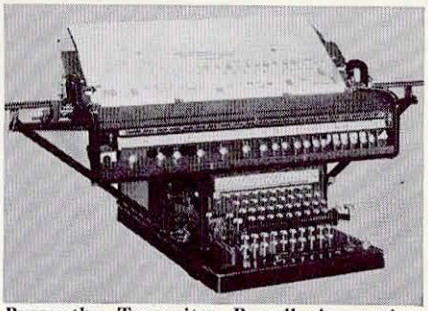
Burroughs Adding Machine Company
6539 Second Boulevard, Detroit, Michigan

Send me the new folder, "Modern Payroll Methods"—which includes illustrations of forms for compiling figures required by the Federal Social Security Act.

Name_____

Address_____

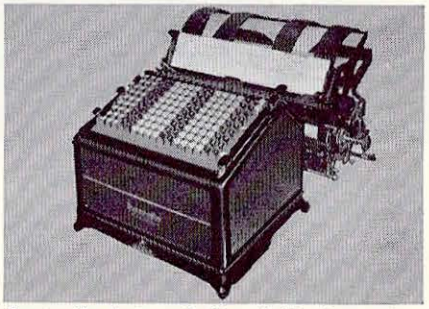
NEW MACHINES FOR PAYROLL ACCOUNTING



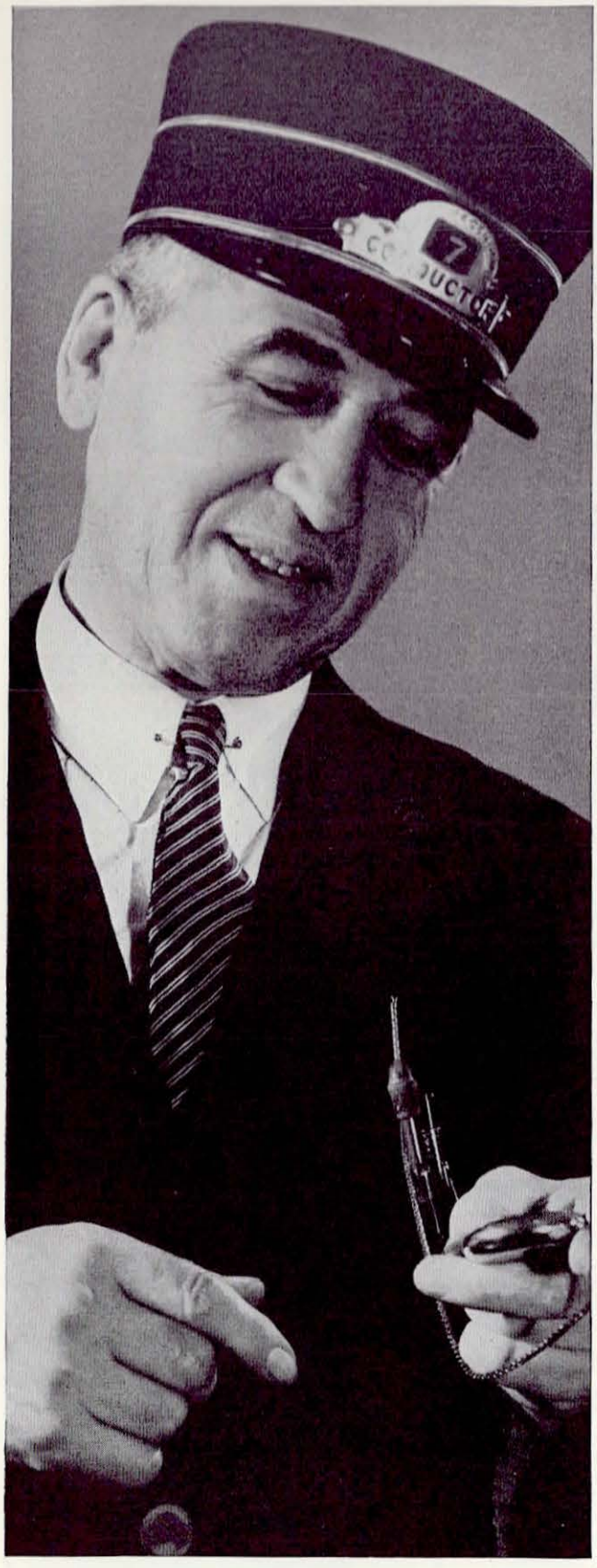
Burroughs Typewriter Payroll Accounting Machine writes check, earnings record, employee's statement and payroll summary in one operation. Column selection automatically controlled. All totals accumulated.

Burroughs Desk Bookkeeping Machine posts earnings records, automatically prints dates in proper columns, automatically subtracts deductions—calculates net pay.

Burroughs Electric Carriage Check-Writing Typewriter writes payroll checks either in units or in strips. Payroll summary completed at same operation. Fast and easy insertion and removal of checks.



Burroughs Automatic Payroll Machine writes check, employee's earnings statement, earnings record and payroll summary in one operation. Accumulates all necessary totals, automatically ejects and stacks checks in order.



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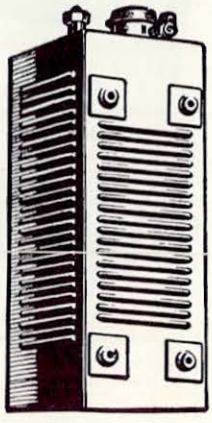
The only kind of batteries most patrons know about are the ones in their automobiles. Aboard a train when the lights go dim at way-stations, or the temperature begins to climb, they don't — as electrical men usually do — blame the battery. They blame the railroad. And that's unfair, considering the thousands of dollars the railroad invests to make the car comfortable for the passenger.

This investment can be protected by installation of the Edison Steel-Alkaline Battery which does not fail unexpectedly. In fact, this modern battery meets every modern railroading requirement. Lighter in weight, able to take higher charge rates, fitted for all kinds of weather conditions, they pay their way by their own economies. The extra dependability is a bonus that costs the railroad nothing. Remember, however, that the Edison is the only steel-alkaline battery built in this country; all others are lead-acid.

Edison
STORAGE
Battery



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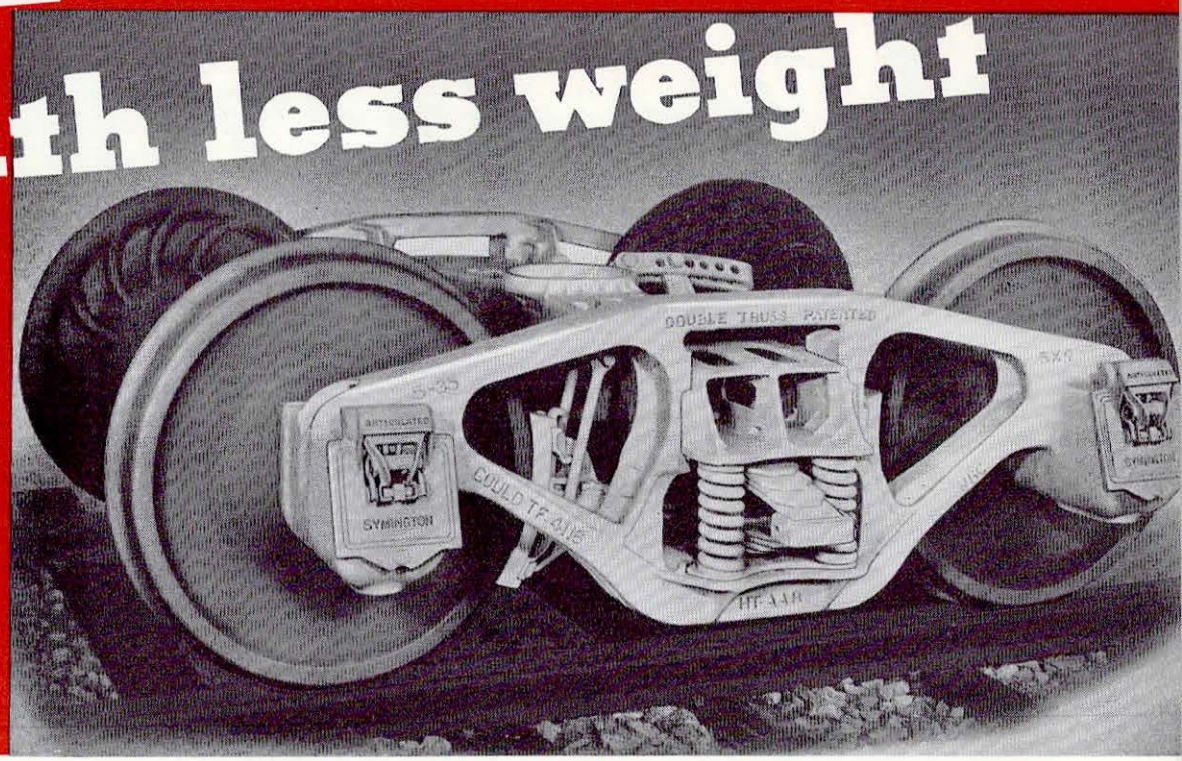
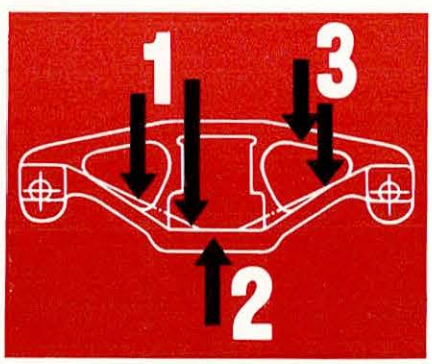


The side frame design of the Self-Aligning (spring-plankless) Truck has been developed through years of observation of static and dynamic testing to rigid standards. Proper distribution of metal provides strength with no added or excess weight.



1 Patented Double Truss construction with tension members extending through columns into spring seat, reducing the spring seat span, gives essential rigidity to central section of the side frame.

2 Convoluted box section forming double-truss spring seat provides short beam construction, reduces local deflection and furnishes adequate support for preferred spring group.

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SELF-ALIGNING TRUCKS

spring-plankless double-truss

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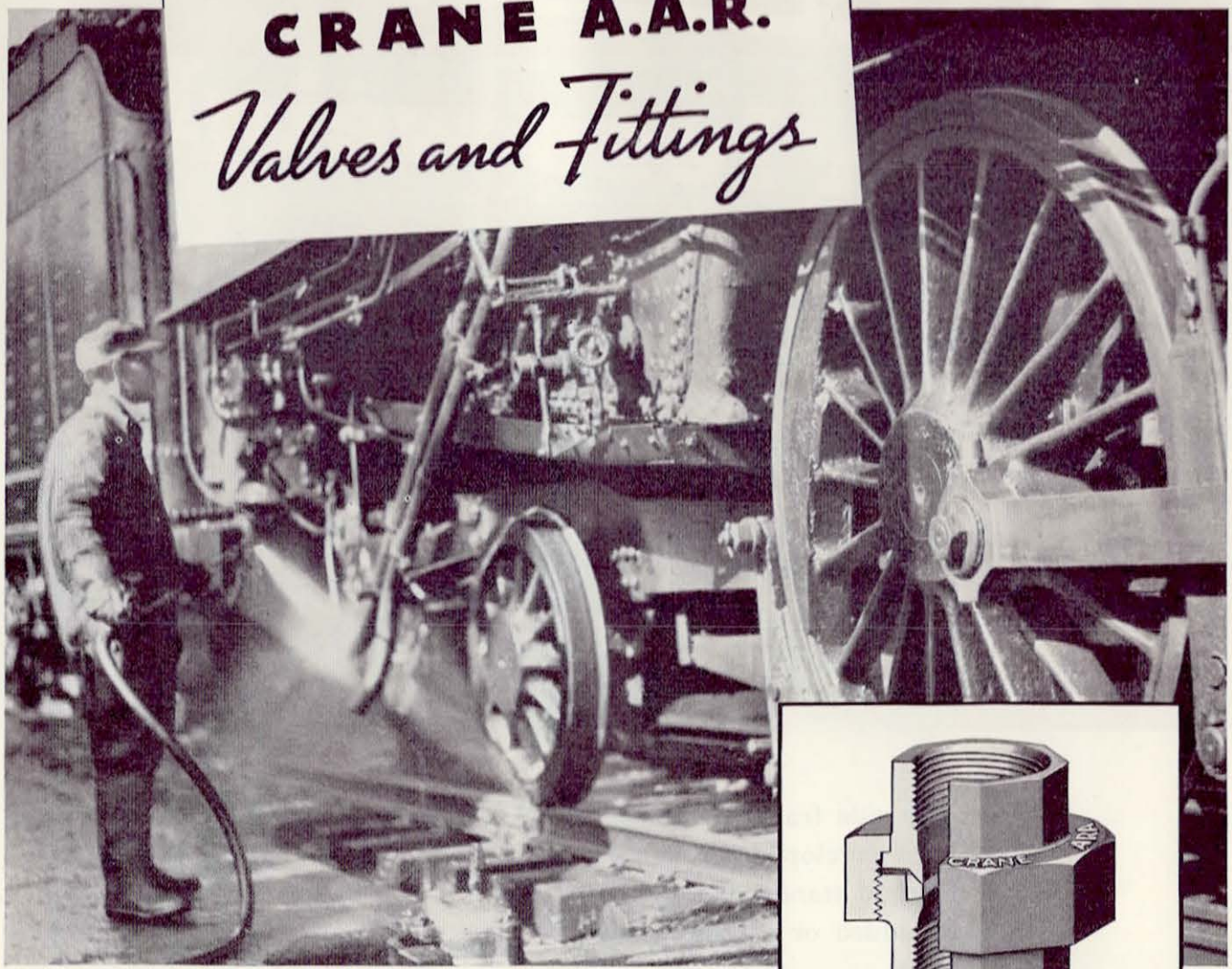
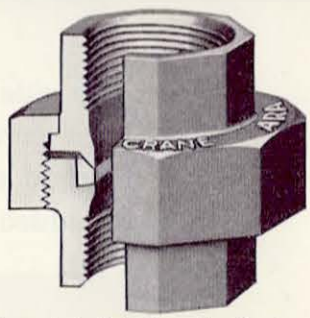
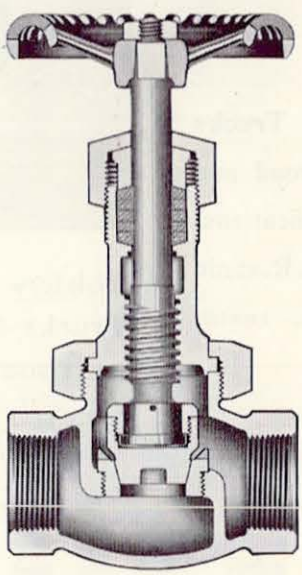
Valves and Fittings





Crane A. A. R. Unions, described and listed on page 240, New Crane No. 52 Catalog



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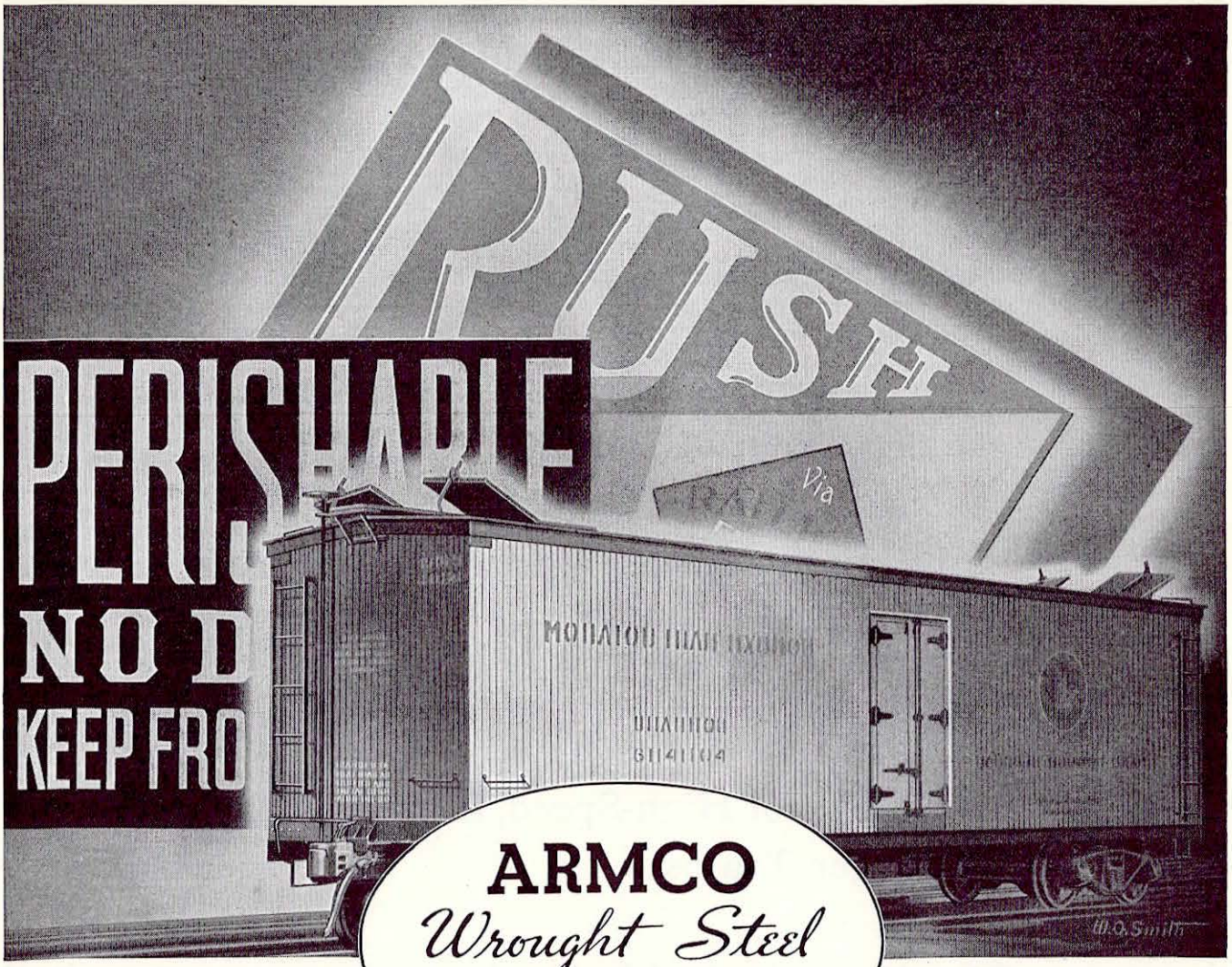

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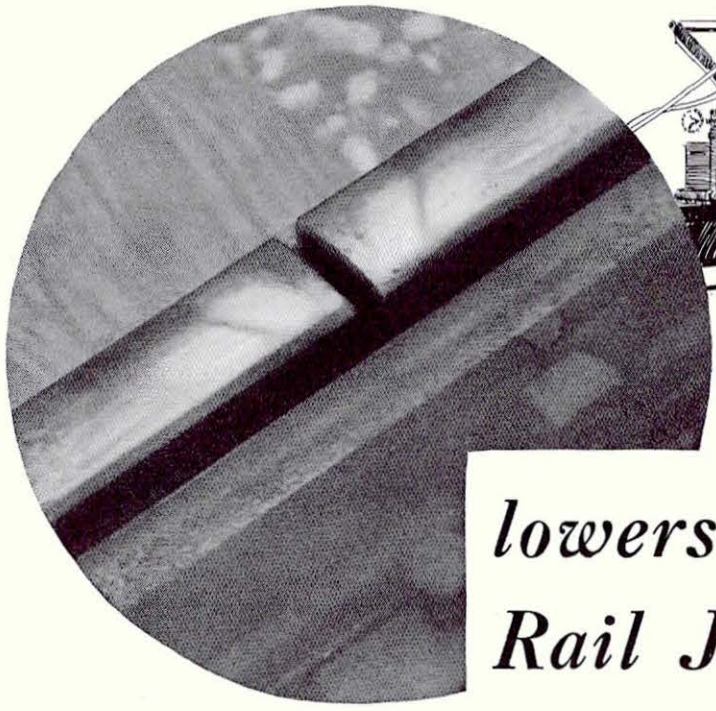

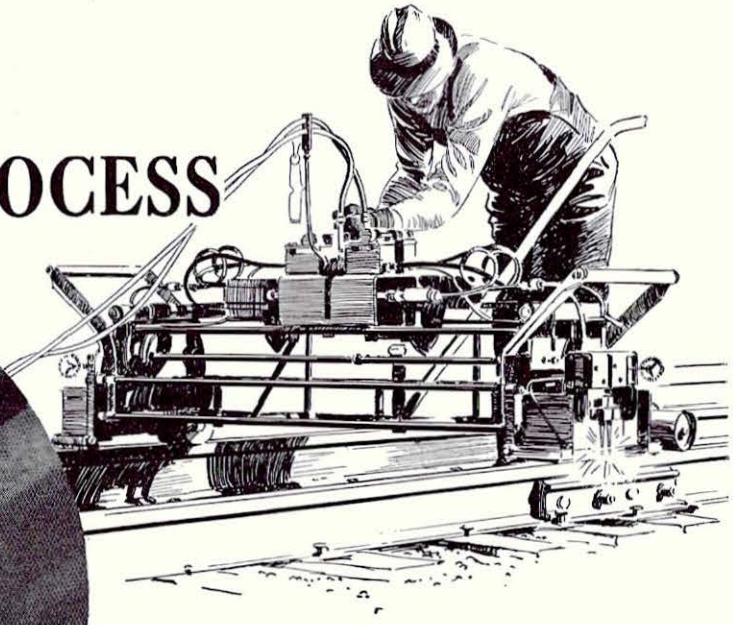

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BLOW-OFF COCKS — hand or power operated. — Designed to last out the life of the locomotive upon which they are mounted.

Troublesome Locomotive Auxiliary Exhausts

May now be disposed of in the same manner and by means of the same equipment as that used in disposing of the boiler blow-down stream.

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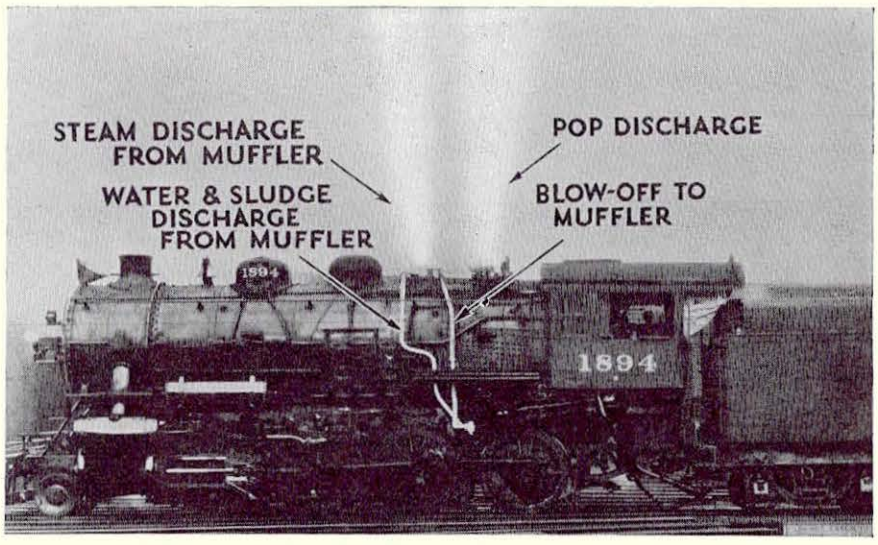

WHEN the blow-off cock is open, its nozzle discharge picks up the auxiliary exhaust in centrifugal separation of steam from condensate; releasing the steam vertically to the atmosphere, and dropping the water to the ash pan or track by gravity.

When the blow-off cock is not open, the auxiliary exhaust is expanded into the chamber of the muffler under a baffle plate. Such condensate as may occur is dropped by gravity to the track, and vapors alone pass out of the top opening and over the cab roof deck.

More than fifty railroads now using various types of Wilson Blow-Off Equipment may make the adaptation without major changes, by consulting with us; the improvement having a patent-pending status. Ask for a print of Drawing No. 92-A.

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COUPLER AND DRAFT GEAR COMMITTEE

Certificate of Approval for Draft Gear

Number EIGHT

Manufacturer PEERLESS EQUIPMENT COMPANY

Type Designation of Draft Gear PEERLESS TYPE H-1

Date of Certificate Sept 8.1934-Re-issued Sept 9,1935

Issued under A. R. A. 1931 Specifications

This certificate is evidence that the Coupler and Draft Gear Committee of Division V, Mechanical, American Railway Association, has tested the above type of draft gear and approves it as meeting the draft gear specifications of the American Railway Association which are in effect at this date. Appended hereto, and forming part of this certificate for the purpose of identification, are photographs and descriptions of this type of gear.

7-18-1934

Certified report of test of this gear, dated 8-10-1935 is on file in the office of the Secretary of Division V, Mechanical, American Railway Association.

American Railway Association
Division V, Mechanical
By W. P. Hawthorne
Secretary

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UNDER ALL CONDITIONS
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Use it for *Waterproofing*

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LOCOMOTIVES						✓	✓	
STATIONS	✓	✓		✓				✓
SHOPS	✓	✓		✓	✓		✓	✓
BRIDGES		✓	✓	✓	✓		✓	
TUNNELS		✓	✓		✓			
DRIVEWAYS			✓					
POWER HOUSES	✓	✓		✓	✓		✓	
CONCRETE STRUCTURES		✓			✓		✓	
GRADE CROSSINGS			✓					
CATTLE PENS				✓				✓

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Pin your faith on a material that has maximum water resistance. Use coal tar pitch and coal tar saturated felt or fabric for waterproofing.

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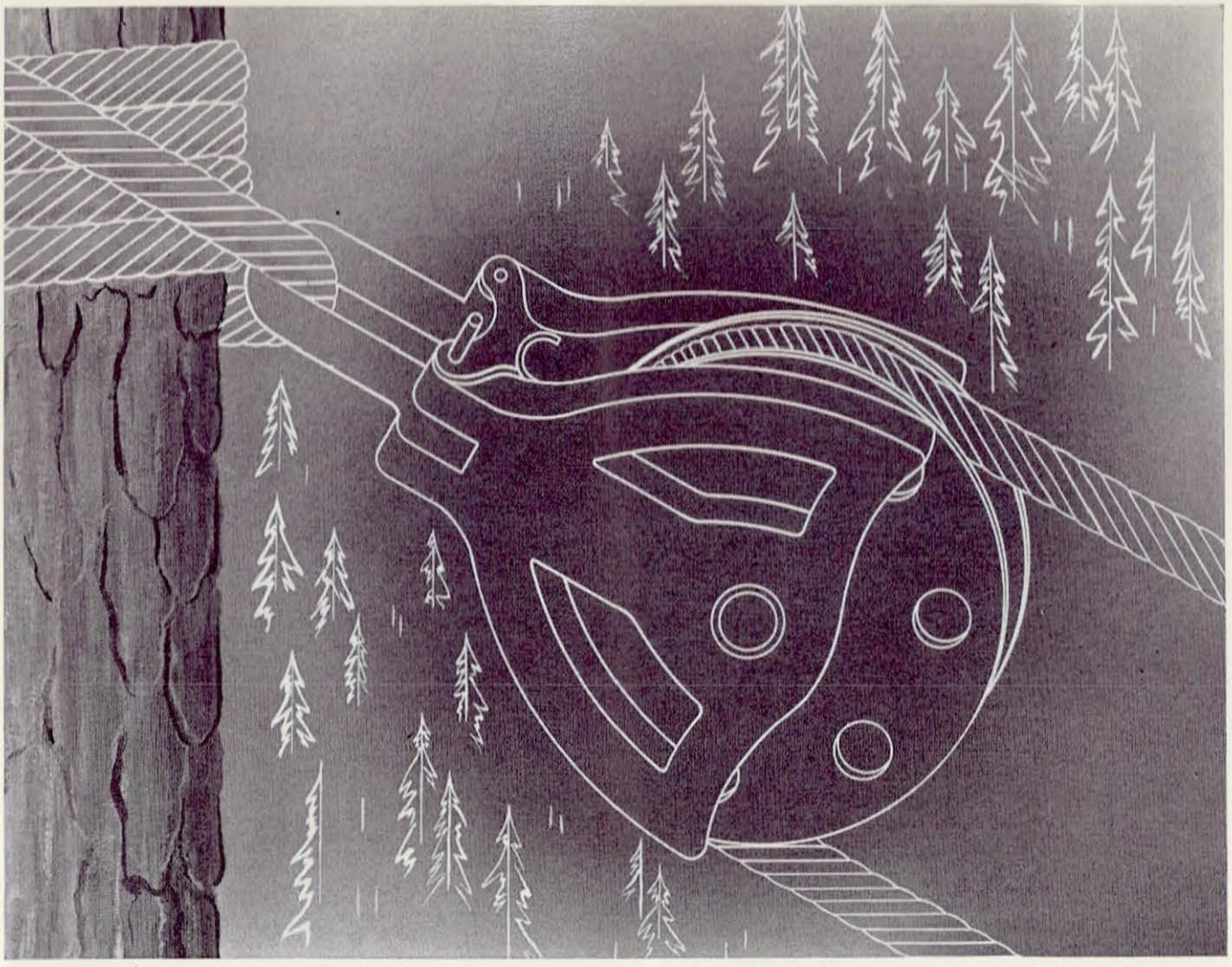

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WHEN operating equipment has to be handled by man-power, the importance of light weight through the use of the strongest possible material comes home with telling effect. Logging blocks, for example. Ask any rigger what a back-breaking job it is to tote them aloft. Think, too, of the abuse they get. . . . Dropped from great heights, battered and banged around, exposed to weather—it's a hard life they lead.

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Railway Age

With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

Vol. 101 September 12, 1936 No. 11

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A review of latest statistics, which show 296 projects completed and 1279 under construction, at a total cost of more than 121 million.

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RAILWAY AGE

Railway Results in 1936

The railways are slowly but surely making the grade. They reported an increase in net operating income of 130 percent in July. The reported increase, although correct, is in a sense misleading, because their financial results in July, 1935, with which comparison is made in published reports, were relatively the worse in any month since April, 1933, while in July, 1936, they were relatively the best in any month, excepting December, 1935, since July, 1933. But statistics given in the accompanying table for the first seven months of the last eight years (1929-1936, inclusive) show how they are making the grade.

The net operating income of over $300,000,000 earned in 1936 was the largest in the first seven months of any year since 1930, and was an increase of 35 per cent over the corresponding part of 1935. The improvement actually began in August, 1935, and total net operating income earned in the twelve months ending with July, 1936, was $578,426,000. This was an increase of 37 per cent over the preceding twelve months and was substantially larger than has been earned in any calendar year since 1930.

Railway Results First Seven Months of—

	1929	1930	1931	1932	1933	1934	1935	1936
Total Operating Revenues	$3,582,416,835	$3,111,900,121	$2,535,419,151	$1,818,701,922	$1,709,046,574	$1,905,907,005	$1,910,943,435	$2,222,672,830
Total Operating Expenses	2,609,038,686	2,378,147,109	1,974,619,720	1,456,698,656	1,263,976,739	1,420,779,947	1,477,393,366	1,669,747,282
Operating Compensation	1,538,995,000	1,429,851,000	1,197,980,000	871,105,000	757,333,000	835,414,000	887,570,000	985,858,000
Other Operating Expenses	1,070,044,000	948,296,000	776,640,000	585,594,000	506,644,000	585,366,000	589,823,000	683,889,000
Operating Ratio—Per Cent	72.83	76.42	77.88	80.10	73.96	74.55	77.31	75.12
Taxes	229,153,192	208,450,360	188,812,731	170,009,447	154,835,597	147,832,344	142,073,012	176,579,272
Net Railway Operating Income	673,323,396	450,935,427	291,278,690	120,900,261	219,481,527	262,308,289	221,664,055	300,021,056
Number of Employees	1,677,001	1,537,325	1,303,895	1,059,743	945,354	1,015,101	987,716	1,045,148
Total Compensation	$1,667,384,000	$1,540,788,000	$1,277,164,000	$916,953,000	$795,518,000	$880,310,000	$939,227,000	$1,048,785,000

The "Come-Back" of the Railways

The decline and "come-back" of the railways during the depression is clearly shown by the accompanying statistics. The decline in their seven months' gross earnings from 1929 to 1933, when they reached bottom, was $1,873,000,000. The increase from 1933 to 1936 was $514,000,000. Therefore, they have recovered about 27½ per cent of the gross earnings that they lost.

The reduction of their operating expenses from the first seven months of 1929 to the first seven months of 1933 was $1,345,000,000. The increase from 1933 to 1936 was $406,000,000, or 30 per cent of the reduction that had previously occurred.

Operating expenses other than compensation of employees declined $563,000,000, and since 1933 have increased $177,245,000, or 31½ per cent of what they declined.

The number of employees declined 731,647. Since 1933 it has increased 99,794, or 14 per cent of what it declined; but the increase in wages has been relatively much greater. Compensation of employees chargeable to operating expenses declined $782,000,000. Since 1933 it has increased $229,000,000, or 29 per cent of what it declined. Total compensation of employees (including that chargeable to capital expenditures) declined $872,000,000. Since 1933 it has increased $253,000,000—also 29 per cent of what it declined.

Taxes declined $74,000,000. Since 1933 they have increased $22,000,000, or 30 per cent of what they declined.

Net operating income reached bottom in 1932. Its decline from 1929 was $552,000,000, or 82 per cent. Its increase between 1932 and 1936 was $179,000,000, or more than 32 per cent of the amount that it declined.

Increased Net In Spite of Increased Wages

Gross earnings in the first seven months of 1936 were 62 per cent of what they were in the first seven months of 1929, operating expenses 64 per cent, employees compensation chargeable to operating expenses 64 per cent, other operating expenses also 64 per cent, taxes 77 per cent, and net operating income only 44½ per cent.

These figures show the railways are far from having recovered their earning capacity, but they are encourag-

(*Continued on next page*)

A Four Years' Discussion

EXACTLY four years ago this week (on September 17, 1932) the *Railway Age* published the first editorial that appeared in its columns during the depression indicating a belief that "a real improvement in general business had begun."

Throughout the subsequent four years it has been calling attention to the upturns and downturns of general business that have occurred, as shown by fluctuations in loadings of freight. It has advocated certain government and business policies as conducive to recovery, and opposed and condemned others as inimical to recovery. It was the first publication in the United States to criticize certain important New Deal policies—especially NRA and huge government spending—upon the definite ground that they were economically unsound, and would retard or arrest the recovery which this was apparently the first publication to say definitely, as early as September, 1932, had actually commenced.

As a contribution to the discussion of what has been done, what should not have been done, what should have been done, and what should be done in future to promote recovery, this paper ventures, in the hope that they may be helpful, to publish the following quotations from editorials that have appeared in its columns during the last four years:

The Beginning of Recovery

September 17, 1932.—The statistics of freight car loadings for recent weeks indicate that a real improvement in general business has begun.

October 29, 1932.—The increase in car loadings between June and October, 1932, which was **seven times** as great as between the same months of 1930 and 1931, is the most conclusive answer that could be given to the question as to whether business at last has begun substantially to improve. **This improvement unquestionably is mainly due to natural economic developments.**

January 14, 1933.—No better evidence of the change in the trend of general business that began last summer could be afforded than the facts regarding railway freight traffic and earnings in the first eight months and in the last four months of 1932 . . . In the first eight months of the year the total net operating income earned was $152,295,000, or 57 per cent less than in 1931, while in September, October and November it was $147,665,300, or only 5.6 per cent less than in 1931.

February 4, 1933.—Readjustments already made, and increasing confidence and courage among business men and the public generally, explain the improvement that already has occurred, and there seems good reason to hope that the operation of economic forces will overcome the resistance of organized minorities, and that the improvement already begun will continue.

What Government Should Do

March 4, 1933.—This paper believes the purely economic problems that must be solved to revive business are plainer and simpler than most persons think . . . **What government should do is, not to try to tell the people what to do, and tax them to death to carry out the theories of politicians and bureaucrats,** but

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Railway Results in 1936

(*Continued from preceding page*)

ing in most respects. The 10 per cent deduction from basic wages was in effect during six of the first seven months of 1932, all of the first seven months of 1933 and six of the first seven months of 1934. The restoration of wages was begun in installments on July 1, 1934, and completed on April 1, 1935. Hence the only period reviewed in which the pre-depression wages were in full effect was the first seven months of 1936. In spite of this the net operating income earned was larger than in the first seven months of any year since 1930. Comparing 1936 with 1931, when the same basic wages were in effect, the reduction of $312,000,000 in gross earnings was almost offset by a reduction of $305,000,000 in operating expenses, and the ratio of operating expenses to gross earnings was actually smaller in 1936, being almost 78 per cent in 1931 and 75 per cent in 1936.

Traffic Trend Still Upward

The fact that gross earnings were still 38 per cent less than in 1929, and that the ratio of operating expenses to gross earnings was only 75 per cent as compared with about 73 per cent in 1929, illustrates what drastic economies have been effected, and how economically the railroad industry is being operated in spite of the increases in costs that have been caused by the restoration of wages and the advances in prices due to NRA.

One important reason why railroad net operating income in July was relatively so large was that in that month freight loadings were relatively the largest in any month since July, 1931, being 70.4 per cent of the 1925-1929 average. They were not relatively as large in August, when they were 67.4 per cent of the 1925-1929 average. It seems evident that general business and freight loadings were artificially stimulated in June, and especially in July, by the disbursement of the soldiers' bonus. Like all the large increases in government spending that have been made during the last three years, the effects of payment of the soldiers' bonus were only temporary; and as soon as they passed general business and freight loadings resumed their previous trend.

Their trend is still favorable, however. Excepting in June and July, freight loadings were relatively the largest in August that they have been since August 1931; and prospects of traffic and net earnings during the last one-third of 1936 are still the best that they have been since 1930.

# of Business and Business Problems

How Editorials in the Railway Age from September 17, 1932, to the Present Time Have Shown the Beginning and Fluctuations of Recovery, and Advocated Sound and Opposed Unsound Policies of Government and Industry

reduce their taxes and release their brains and energies in order that they may do as well as they can for themselves.

March 25, 1933.—The government closed the banks to stop the drain upon them, and a large majority of banks have now been reopened under legislation enabling the government to restrict withdrawals which assure their continued solvency . . . Increase of public confidence has been shown by innumerable public and private expressions and by advances in the security and commodity markets, although some proposed legislation, such as that for farm relief, has been received with misgivings by business.

April 22, 1933.—The present administration and Congress, like their predecessors since the war, have devoted much time, thought and effort to devising and trying measures for the solution of the farm problem . . . Many students of economics will be curious as to how the wise men in Washington can hope to re-establish the pre-war purchasing power of the farmers by new farm legislation, if it is to be accompanied by legislation to compel reduction of working hours in industry and transportation.

Government Policies Questioned

April 29, 1933.—In view of the fact that the general trend of business has been decidedly better for almost eight months than it was before, in spite of serious retarding influences, **many students of economics and business must seriously question the expediency of numerous kinds of legislation which are being advocated in Washington as essential to economic revival.**

May 6, 1933.—The restoration of real prosperity can be accomplished only by measures which will not merely temporarily increase employment, but which will permanently double or treble production in industry, and the traffic of the railways . . . **Any policy which has not increased production in industry as its main objective will make no permanent contribution either to increased employment or to increases in the real incomes of those who get employment.**

May 20, 1933.—There is an evident determination in Washington to spend large amounts of government money to stimulate a revival of business. **The less of it is spent on public works of doubtful value, and the more of it is spent to increase employment in the private industries in which the decline in employment has occurred, the better it will be for everybody.**

The "New Deal" Begins

June 24, 1933.—The "New Deal" in the economic affairs of the United States began when Congress adjourned last week . . . It is, however, seriously questionable whether the heroic measures adopted were not ceasing to be needed and what effects they will produce.

July 15, 1933.—As the improvement actually began ten months ago, it is plain it has been mainly due to the same general economic causes which terminated all previous depressions . . . The *Railway Age* is frankly skeptical regarding the extent to which general business will be either temporarily stimulated or permanently benefited by the government's public works program, or by any policy of actual inflation which it may adopt . . . **The government can help or hinder, but government direction and action can never, until a complete policy of socialism has been adopted, serve as a substitute for private initiative and enterprise.**

September 9, 1933.—General business, as measured by freight car loadings, improved more than seasonally in April, May, June and July, and then improved less than seasonally in August . . . **It seems highly probable that in large measure the reaction in August was due to new problems and uncertainties injected into business by the government's various recovery policies** . . . One important factor of uncertainty that is being introduced into business is the attitude of the administrators of the recovery legislation toward losses and profits . . . Furthermore, much alarm has been spread through business by the apparent tendency of the government to favor a labor policy which labor leaders throughout the country construe to mean the closed shop. In consequence, the administrators of the government's policy have succeeded in spreading fear instead of confidence through a large part of business. The fear of losses and boycotts is not a good substitute for confidence among business men as a means of promoting recovery.

Danger of Increasing Costs in Industry

September 23, 1933.—From the beginning we have regarded with skepticism the industrial and agricultural recovery policies of the administration, fearing, among other things, first, that they would prevent an adequate increase of agricultural purchasing power by unduly increasing the production costs and prices of things that the farmers must buy, and second, that by increasing costs in industry they would cause industrial concerns to raise their prices to reduce their losses or increase their profits with the effect of curtailing the effective demand for their products.

September 30, 1933.—The trouble with certain half-baked economic theories that recently have been widely disseminated and accepted is, that they disregard facts of the most vital importance. Among these facts are, that that large part of the important industries of this country which is devoted to the production of capital goods has been developed to provide means of increas-

ing production and reducing the labor cost of production; that the sole motive of business men in trying to increase production and reduce its cost is to reduce losses and increase profits; and that therefore **any government policy which even temporarily discourages efforts to reduce losses or increase profits tends directly to prevent revival of the capital goods industries and of employment by them.**

Government Policies Cause Recession of Recovery

October 21, 1933.—The figures show that there was a marked improvement in business during the last one-third of 1932, and another marked improvement during April to July, 1933, inclusive, during which the recovery policies of the administration affected business only by anticipation, **while since July there has been a steady recession as a result of which in the two weeks ended October 7 business was only slightly better relatively than in June and only relatively as good as in December, 1932. . . . The only new and important influences by which business has since been affected have been the administration's revolutionary policies.** Developments under them have not altered our belief in the desirability of giving nature a large measure of opportunity in business in general and on the railroads in particular.

November 4, 1933.—Freight car loadings are the best single measure of the total volume of business activity, and, General Johnson to the contrary notwithstanding, they demonstrate that for three months the trend of business has been downward. . . . Government policies which tend to monopolize the market for capital and to restrict profits in private business tend directly to delay financing of the expansion of private business.

December 16, 1933.—In view of the industrial history of the last one hundred years and of existing conditions, **it is a preposterous exhibition of ignorance and lack of foresight to imply that the observance of sound economic principles by government and business will not cause future increases of production, commerce and the national income which will make the production, commerce and national income of recent years of prosperity seem small. . . .**

Durable Goods Industries and Recovery

February 24, 1934.—Until government and business can and do effectively co-operate to increase the profits in business which are necessary to make possible a large increase in buying from the durable goods industries there will be no real economic recovery in this country.

April 28, 1934.—The (railway wage) settlement reached is a gamble on the future trend of railway earnings—a gamble justified perhaps in the interest of peace, but a gamble nevertheless.

May 12, 1934.—The principal menace to the continuing revival of business is that production costs and prices may be advanced more rapidly than economic conditions warrant, with the effect of impairing the buying power and effective demand of both industries and individuals. That advances in wages increase costs of production, and that increased costs of production necessitate advances in prices, seems axiomatic; but increases in the total volume of production and commerce are the things needed fully to revive business, and general advances in prices are a very doubtful means of increasing the demand for commodities.

July 7, 1934.—A review of recent railroad developments affords good illustrations of how much more important is politics than economics in the philosophy and activities of those now dominating affairs in the United States. . . . The revival of the durable goods industries is now ostensibly the main objective of government policies, but Congress and the President could have done nothing more effective to reduce railroad buying from the durable goods industries than to have added this pension legislation to the advances in railway wages which began on July 1.

New Deal Retards Recovery

August 11, 1934. During the eleven months from September 1, 1932, to July 31, 1933, the present revolutionary "recovery" and "reform" policies of the Roosevelt administration were not in effect. General business, as measured by car loadings, improved throughout this period excepting during the banking crisis in the first quarter of 1933. What has occurred since August 1, 1933, under the novel "recovery" policies illustrated by NRA, AAA and the public works program? General business, as measured by car loadings, declined in August, September and October, 1933, increased during the next five months, and declined again during the next four months. The net result was that car loadings in July, 1934, were 5½ per cent less than in July, 1933. . . . No sound economist or intelligent business man can agree any longer with policies predicated upon the assumption that labor costs in industry should be advanced to increase national purchasing power; that the profits in the industries that must be relied upon to buy from the durable goods industries can be reduced and the durable goods industries at the same time be revived; or that an orgy of government spending and taxing, together with other policies such as those just mentioned, can ever "prime the pump of business."

Railway Situation Made Worse

September 8, 1934.—The railroads are confronted with a combination of difficulties, some of them new. Their operating expenses have been sharply increased within recent months by NRA advances in prices, wage advances and the recent pension legislation, which has been appealed to the courts. On an annual basis the increases in expenses due to NRA and restoration of wages are estimated at $293,000,000 in the petition for an advance in freight rates presented to the Interstate Commerce Commission. Freight business has declined to relatively the lowest level since May, 1933, and is now relatively as small as in December, 1932. The *Railway Age* predicted, when the pension legislation was passed, that, in view of other unfavorable developments that were occurring, it would be followed immediately by a reduction of railway employment. This prediction has been fulfilled.

September 22, 1934.—Very much the worst phase of the situation is the decline of production and commerce. . . . This paper predicted from its inception that the New Deal would hinder the natural improvement which began two years ago, but we believed the natural forces of recovery would prove stronger than the New Deal policies. The great drought and the New Deal combined have, however, recently proved too strong for these natural forces.

Severe Decline in Car Loadings

October 6, 1934.—If the President thinks all the "awesome pronouncements" regarding some of the administration's recovery, relief and reform policies have related to their constitutionality or have emanated from reactionary lawyers and political editors he is singularly uninformed. They have caused the greatest alarm among and drawn the most destructive attacks from business men, economists and editors who are much less concerned regarding their legal or political phases than

because of their manifest tendency to hinder the increase of production and commerce which alone can cause the full re-employment of labor and the increase of national income with which to pay it.

October 13, 1934.—Huge government expenditures for so-called—and often loosely called—public works began late last year. Intended to "prime the pump" of general business, they did have the effect of starting the trend of carloadings upward again, and in March, 1934, a new peak was reached. . . . Early in the spring of this year not even a continuation of heavy government expenditures could overcome the growing lack of confidence in administration policies, and the relative rise in carloadings was succeeded by a decline. . . . **The last drop in carloadings, from March to September, was the most extensive and long continued decline since the first half of 1932. . . .** Far from helping business recovery, the policies of the New Deal have plainly hindered it and reversed an upward trend which, before the New Deal began, had continued with only one interruption for a full year.

November 3, 1934.—**The only way out is clear. This is to change economic facts and prospects by changing government and business policies.** The durable goods industries are the key to the present situation. . . . A large and lasting increase in buying from them can be accomplished only by increasing the profits of the railroads and other industries. Increase of profits in general business is dependent upon increases in the volume of production and commerce unaccompanied by corresponding increases of operating costs until production and commerce approach normal.

February 23, 1935.—It cannot be said that much recovery has been accomplished when, since August, 1932, general business has regained less than one-third of the ground that it lost during the preceding less than three years. In large measure the recessions of business, and consequent small total recovery accomplished, especially during the last two years, have been due to well-intended efforts to prevent the next depression and its effects, whereas the real and pressing problem is to terminate the present depression and its effects. . . . The best way to provide relief and security is to restore to the unemployed at reasonable wages the jobs in private business that they formerly had.

Railway Situation Worst Since 1932

April 6, 1935.—Almost a year ago—on April 26, 1934—the railways agreed to rescind, in installments on July 1, 1934, and January 1 and April 1, 1935, the deduction of 10 per cent from basic wages put into effect in February, 1932. The completion of this program by the restoration of the last 5 per cent on April 1 makes the average hourly wage of all but officers once more the highest in history. . . . The railways agreed to restore pre-depression wages because of both hope and fear. They hoped for continuance of the improvement in business which apparently had been occurring during the last quarter of 1933 and the first quarter of 1934. They feared refusal to agree to restore wages would result in strikes, or threats of strikes, which might bankrupt many of them, and even precipitate government control. . . . General business, and consequently traffic, have fluctuated, but there has been no improvement. . . . **The railroad situation with which the nation is confronted is actually the worst since the early part of 1932,** and it is so bad because the administration and Congress for two years have done little to help recovery and much to prevent it. The paltering with the transportation problem in Washington is but one of many illustrations of the prevailing tendency of public men to evade or disregard the problems that must be solved to promote economic recovery.

Predictions Regarding Supreme Court Decisions

May 18, 1935.—**The decision of the Supreme Court of the United States holding unconstitutional the railroad pension act may prove to be one of the most important in the court's history, to the railroads in particular, and to the nation in general. . . .** It assures private business in general that the power and benevolence of Congress in regulating and taxing are still limited, not by its changing ideas of economic, social or political values, but by the same constitutional provisions for the protection of property and human rights by which they always have been limited.

June 8, 1935.—**The Supreme Court's NRA decision probably will prove the best thing for general business and all classes of the people that has occurred since the banks were closed and re-opened in March, 1933,** because it makes possible at least a partial resumption of the operation of natural economic forces which has been for almost two years interrupted by artificial influences.

June 29, 1935.—Throughout the almost two years that the country had NRA the total volume of production and commerce . . . hardly increased at all, while it was largely increasing in most other countries. It must follow that policies different from those that have prevailed during the last two years must be adopted by government, or business, or both, if general business is to improve. Business cannot afford to have those who should be its leaders continue to "pass the buck" to government in future as they have been doing recently. The Supreme Court's decisions in the NRA and other cases have destroyed some of the government's most important economic policies **and given business a much better opportunity than it has had for two years to show what it can do to revive itself under greatly reduced government interference.**

Marked Upturn in Business

August 17, 1935.—Since the middle of July car loadings have shown an upward trend. The improvement in general business which this and other developments indicate has begun probably is principally due to the decision of the Supreme Court in the NRA case, which destroyed one of the government's principal policies that were hindering recovery.

September 28, 1935.—The trend of general business has been more sharply upward since early in July than during the latter part of summer in any year since the depression began. Car loadings have almost continuously, week by week, made more than seasonal increases. In the nine weeks ending with the middle of September they increased less than 3 per cent in 1930, declined 2 per cent in 1931, and increased almost 17 per cent in 1932, 1 per cent in 1933 and 7 per cent in 1934. During the same period in 1935 they increased almost 24 per cent. . . . The improvement of general business, and consequent increase of car loadings, are giving the railroads the principal thing they need—an increase of gross earnings. The net earnings reported by them for August and September will be relatively larger than those reported for July, and, if the business improvement continues, their net earnings in the last one-third of the year will compare favorably with those made during the corresponding part of recent years.

Prediction Regarding Railway Buying

December 7, 1935.—The improvement in business which has been occurring through the last four months is

real and substantial and bids fair to continue. . . . Like that which began in 1932, **the current improvement must be attributed by every person whose conclusions are based on economic facts and principles solely to the operation of natural economic forces.** In the long run these forces usually prove stronger than all the efforts of politicians to stimulate or hinder their working. Perhaps they will yet be prevented by New Dealers and Old Dealers, most of whom have about equally unsound economic philosophies, from restoring prosperity. But this does not seem probable. After listening to the nostrums of theorists and politicians, the people always finally decide it is time to go to work, and by their mental and manual labors, to increase production of goods—the only source of wealth and income.

December 14, 1935.—This is the first year since 1932 when the trend of net operating income was upward during the fall months. . . . **The reason why the recent rapid increase in net operating income is so important to the manufacturing industry is that, as repeatedly has been statistically demonstrated by the *Railway Age*, the amount of railway buying done from manufacturers is determined, not only for long periods, but year by year, and almost month by month, by the amount of net operating income earned.**

"Spectacular Increase" in Railway Buying

March 7, 1936.—There has been need for more buying of railway equipment and other facilities throughout the depression. **The cause of the actual increase now occurring is the increase in net operating income earned** throughout the seven months August to February, inclusive, and which will continue unless arrested by a recession of traffic, or by the adoption of more government policies increasing railway operating expenses. . . .

April 11, 1936.—During the first quarter of this year there have been reported in *Railway Age* domestic orders for 88 per cent as many locomotives, 47 per cent as many freight cars and 58 per cent as many passenger-train cars as were ordered during the entire 12 months of 1935. Also, the tonnage of rails ordered this far in 1936 is 72 per cent as large as that ordered throughout last year.

July 4, 1936.—**The most spectacular increase in railway purchasing since the beginning of the depression was made in the first six months of this year. . . .** Counting both materials and equipment purchases from manufacturers, the total business done with manufacturers since January 1 was an increase of $120,000,000 or 60 per cent above the total for the first six months of 1935; an increase of $56,000,000, or 20 per cent above the corresponding figure for 1934; an increase of $215,000,000, or almost double the figure for 1933; an increase of $27,000,000, or almost 10 per cent above the six months of 1931.

Most of Recovery Before New Deal

August 15, 1936.—Of the entire increase in average weekly car loadings that occurred between the bottom of the depression in July, 1932, and July, 1936, over **63 per cent** occurred between July, 1932, and July, 1933, before the New Deal policies were in effect, while less than 37 per cent of it occurred during the subsequent three years, during which all or part of the New Deal policies were in effect. The increase in average weekly car loadings in July, 1933, over July, 1932, was 141,421, while the increase in average weekly car loadings in July, 1936, over July, 1933—during a period of three years—was only 81,790. . . . Many persons largely attribute the recovery that has been occurring within the last year to government spending, and fear its reduction would cause a recession of business. But there was no huge government spending in the year ending with July, 1933, when there occurred 63 per cent of the entire increase in railroad loadings that has occurred since the bottom of the depression was reached. . . . **The indisputable facts demonstrate that the bulk of the recovery from this depression that has thus far been made cannot, by any rational and unprejudiced person, be attributed to artificial measures, including government spending.**

Railroad Improvement Still Continues

August 22, 1936.—Statistics of railroad freight loadings show that the recovery of business which has been occurring within the last year has been well balanced. . . . They show that in the twelve months ending with June, 1936, as compared with the twelve months ending with June, 1935, the increase in the production and distribution of durable goods was relatively much greater than was the increase in the production and distribution of consumers' goods.

September 5, 1936.—Complete totals of railway revenues and expenses show that for the first seven months railway net operating income was 35 per cent above the same period in 1935. . . . During the first eight months of this year 134 locomotives, 34,254 freight cars and 141 passenger train cars (excluding articulated streamline trains) have been ordered. This compares with 83 locomotives, 18,699 freight cars and 63 passenger cars for the entire year 1935.

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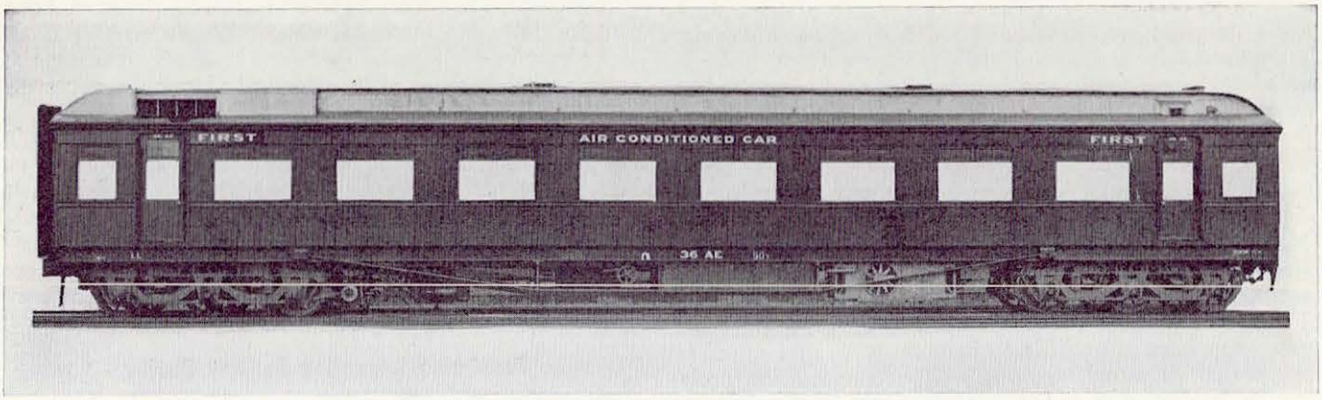
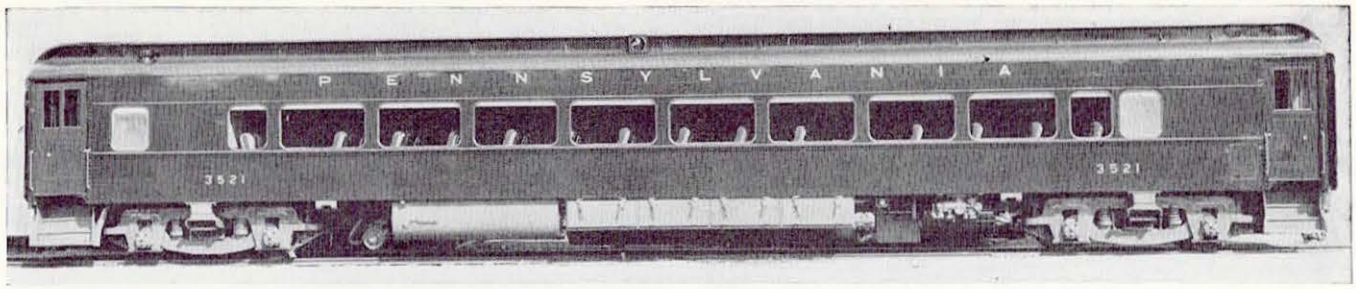


Air Conditioned Car on the Victorian Railways of Australia



A Pennsylvania P70 Class Coach Modernized According to Scheme No. 2

Pennsylvania Experimenting with Coach Modernizing Schemes

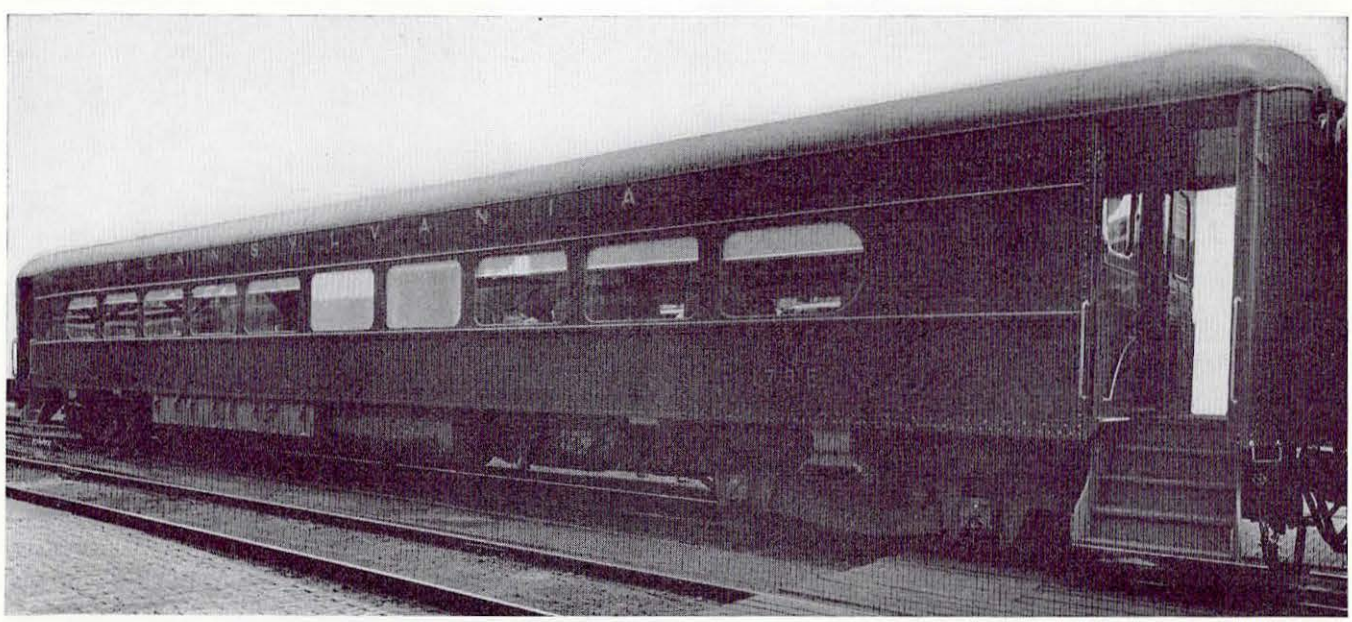
Three refitted coaches, each differing in details of seating, decoration or interior arrangement, placed in service to test public reaction

THE Pennsylvania has developed three schemes of modernizing existing steel passenger coaches of its P70 class. One coach has been refitted in accordance with each scheme and the three coaches are now in experimental service between New York, Philadelphia, Baltimore and Washington to ascertain the public reaction to the added comfort and convenience embodied in the refitted cars.

The P70 class steel passenger coaches of the Pennsylvania are 70 ft. 5¾ in. long over body ends. They have been built with various seating arrangements. The greatest seating capacity with the customary type of walkover seats was 88. Coach No. 3525, designated as Scheme No. 1, provides seats for 60 passengers. In refitting this coach no changes were made in the car body. The former window sashes were, however, replaced with aluminum sashes fitting the same openings.

New double seats have been installed. The seat frames are of tubular steel design finished with triple chromium plate and were built to the designs of the railroad. They are mounted on aluminum bases of the eccentric revolving type. The cushions, both in the seats and backs, are of spring and hair-felt construction. A folding center arm rest is provided. The backs are non-adjustable.

All three coaches are fitted with ice-activated air-conditioning equipment. In conformity with the Pennsylvania 1936 air-conditioning program the heat-exchanger coil and blower equipment are floor mounted in lockers at either end of the car. In Scheme No. 1 ducts lead from units in the lockers to the grille openings over the doorways in the bulkheads. Floor space at each end of the coach is taken up with the toilet room, with a washroom on the opposite side of the aisle. With the addition of the locker for the air-conditioning equipment the space across the aisle from the latter is utilized as a heavy baggage rack and the bulkhead at each end of the pas-



Pennsylvania P70 Class Coach No. 1735 Modernized According to Scheme No. 3

senger compartment extends in an unbroken plane across the car.

A hot-water connection has been added to the lavatories in this car.

Car No. 3521, the changes in which are known as Scheme No. 2, is the same as the preceding car in seating capacity and general floor-plan arrangement. Certain structural changes were made in this coach in the process of its modernization. The intermediate piers between window pairs, which are not an essential part of the frame structure, were removed, thus doubling the width of the window, and new outside sheathing was applied between the letterboard and belt rail. This sheathing is formed to provide well rounded window corners; those toward the ends of the car are finished in a semi-circular curve. The new glass is applied directly against the outside sheathing of the car without sashes, the glass being held by the stainless steel curtain hood and by post and sill trim. The sashes are 2 ft. 8 in. high by 5 ft. 2 in. wide.

The seats in this car are built up on frames of stainless steel tubing instead of chromium-plated tubing, and the seat cushions are rubber. The backs have spring and hair cushions. Like those in the preceding car, the backs of the seats are unadjustable.

An entirely new feature in this car is a folding tray, two of which are attached to the back of each double

Interior of Coach No. 1735

seat. These trays are permanently attached to the seats. When not in use they fold up tightly against the backs of the seats out of the way. Each tray may be readily lifted and unfolded into horizontal position before the passenger, in which position it is available for writing, game playing or serving of coach lunches.

The air-conditioning system employs bulkhead distribution in this car, the same as in Scheme No. 1. The lighting fixtures are spaced the same as in the present type of P70 coach. The fixtures themselves, however, are new and light is distributed through diffusing glass.

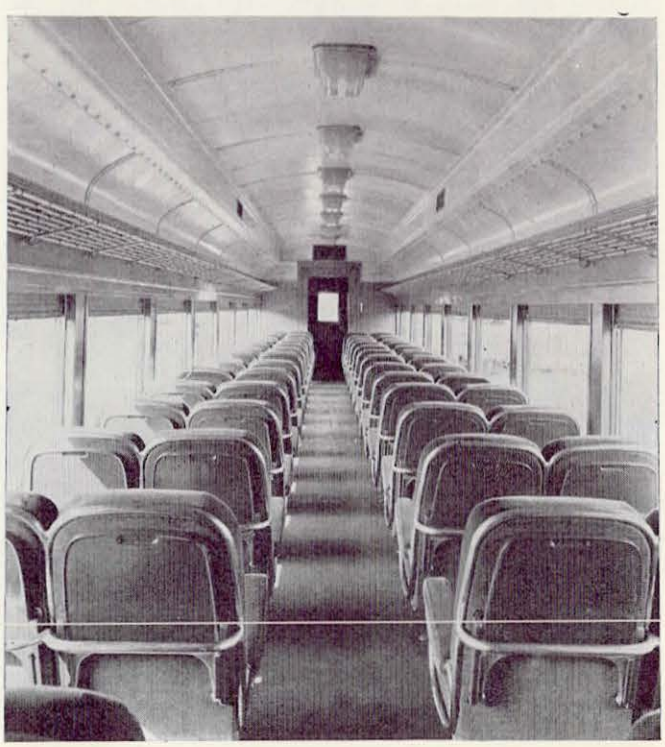
In this car the washroom facilities have been supplemented by the addition of a lavatory in each toilet room. All lavatories are supplied with hot and cold water.

Scheme No. 3 represents a greater departure from the conventional passenger coach arrangement than either of the other two and is intended primarily for the service of long-distance over-night passengers. With double seats on one side of the aisle and single seats on the other, the seating capacity is 42. This scheme is embodied in coach

Interior of Coach No. 3521

No. 1735. The original roof of this car required renewal and was removed and replaced with a newly designed arch roof from which the clerestory is eliminated. The new carlines are of truss form built up of angle top and bottom chords joined with truss connections of flat section. The alterations in the sides of the car were the same as those involved in Scheme No. 2 and the window size and spacing is the same.

The arrangement of the floor plan in this car has been materially changed. The toilets and washrooms have been removed from the ends of the car and placed near the middle, thus breaking up the body of the car into two



Folding Trays Are Fitted to the Backs of the Seats in Coach No. 3521

passenger compartments. The lockers for air-conditioning equipment and the heavy-baggage racks are retained at the ends. The ceilings as well as the partitions of the center toilet and washroom facilities are of metal-faced plywood.

The air distribution from the air-conditioning system is effected from a central ceiling duct from which the conditioned air is spilled into the car at an angle of approximately 45 deg. In the center of the duct is a new continuous lighting fixture of diffusing glass with light sources spaced approximately with the seats.

There are 14 double and 14 single seats in this car. The double seats are unusually spacious and, in addition to having the eccentric rotating reverse feature, each is provided with individual separately reclining backs, adjustable in three positions. All of the seats are built up on stainless steel tubular frames and have rubber cushions both in the seats and in the backs.

Essentially the same scheme of decoration has been followed in all of the cars. The ceilings are in cream and the ends and sides in gray to the floor. All window sills are black. Those in Schemes Nos. 1 and 2 are enameled wood. In No. 3 black composition sills and connecting molding have been applied. The floor is covered with ⅛-in. purple marbleized rubber sheet laid on felt, except that in Scheme No. 3 the aisle strip is of marbleized gray rubber. The upholstery is in blue mohair and the inside faces of the window shades are a blue-gray tone which harmonizes with the wall and upholstery colors. The parcel racks are finished in silver-bronze paint. In both Schemes Nos. 2 and 3 the heavy-luggage racks are closed with curtains. An added feature of the interior decoration of Scheme No. 3 are maroon drapes at the windows.

The toilets and washrooms of Schemes Nos. 2 and 3 are fitted with colored porcelain fixtures—black in the men's rooms, with gray walls and ceilings, and old rose in the women's rooms, with walls and ceilings in a similar tone.

No change was made in the hardware in Scheme No. 1. The existing hardware was retained in Scheme No. 2, but it was chromium plated. In the car fitted according to Scheme No. 3 chromium-plated hardware of a new design was employed.

The exteriors of all three cars are finished in the Pennsylvania standard red with gold lettering. The only change in the exterior of Scheme No. 1 is the employment of chromium-plated handholds and grab irons. In Schemes Nos. 2 and 3 the standard form of Pennsylvania lettering has been replaced with plain block letters and numbers. The vestibule side doors of Scheme No. 3 are divided into separately opening top and bottom sections.

All three cars have been fitted with the vapor heating system.

THE NINTH ANNIVERSARY of the inauguration of Air Express in America was celebrated September 1 by the 23,000 express offices of Railway Express Agency in this country, and by the hundreds of offices of Pan American Airways, by agreement part of the Agency's air express system, in the United States, Mexico, the West Indies, Central and South America, the Philippine and Hawaiian Islands, Wake, Midway and Guam. In a statement issued to all agents L. O. Head, president of the Agency, said in part: "Air Express was officially inaugurated September 1, 1927, with the arrival at Hadley Field, New Brunswick, N. J., of Bill Hopson, in an open cockpit plane carrying twelve air express packages from Cleveland. That first air express shipment made up largely of articles sent by souvenir hunters and stamp collectors, had grown by June of this year to 41,751 air express shipments made in that month alone, indicating a yearly volume of nearly 500,000 shipments."

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the week ended August 29 totaled 753,742 cars, a new peak for this year and an increase of 18,769 cars over the total for the week before. It was also an increase of 72,894 cars, or 10.7 per cent, as compared with the corresponding week of last year. Loading of coal and grain and grain products showed reductions as compared with last year and grain, live stock, and freight products showed decreases as compared with the week before. Miscellaneous freight showed an increase of 47,246 cars over last year's figures. The summary, as compiled by the Car Service Division of the Association of American Railroads, follows:

Revenue Freight Car Loading
For Week Ended Saturday, August 29

Districts	1936	1935	1934
Eastern	151,090	142,034	136,416
Allegheny	152,041	130,141	114,756
Pocahontas	53,766	48,465	44,137
Southern	102,978	93,293	88,998
Northwestern	121,170	110,418	100,793
Central Western	113,220	103,262	104,628
Southwestern	59,477	53,235	57,803
Total Western Districts	293,867	266,915	263,224
Total All Roads	753,742	680,848	647,531
Commodities			
Grain and Grain Products	36,556	44,576	38,510
Live Stock	15,819	14,202	36,891
Coal	132,157	132,667	121,214
Coke	8,936	5,914	5,280
Forest Products	36,134	31,403	21,818
Ore	55,790	36,741	26,939
Merchandise L.C.L.	166,892	161,133	162,866
Miscellaneous	301,458	254,212	234,013
August 29	753,742	680,848	647,531
August 22	734,973	625,774	606,917
August 15	736,497	614,005	601,788
August 8	728,293	582,077	603,968
August 1	747,551	595,297	612,660
Cumulative Total, 35 Weeks	23,117,473	20,483,602	20,860,502

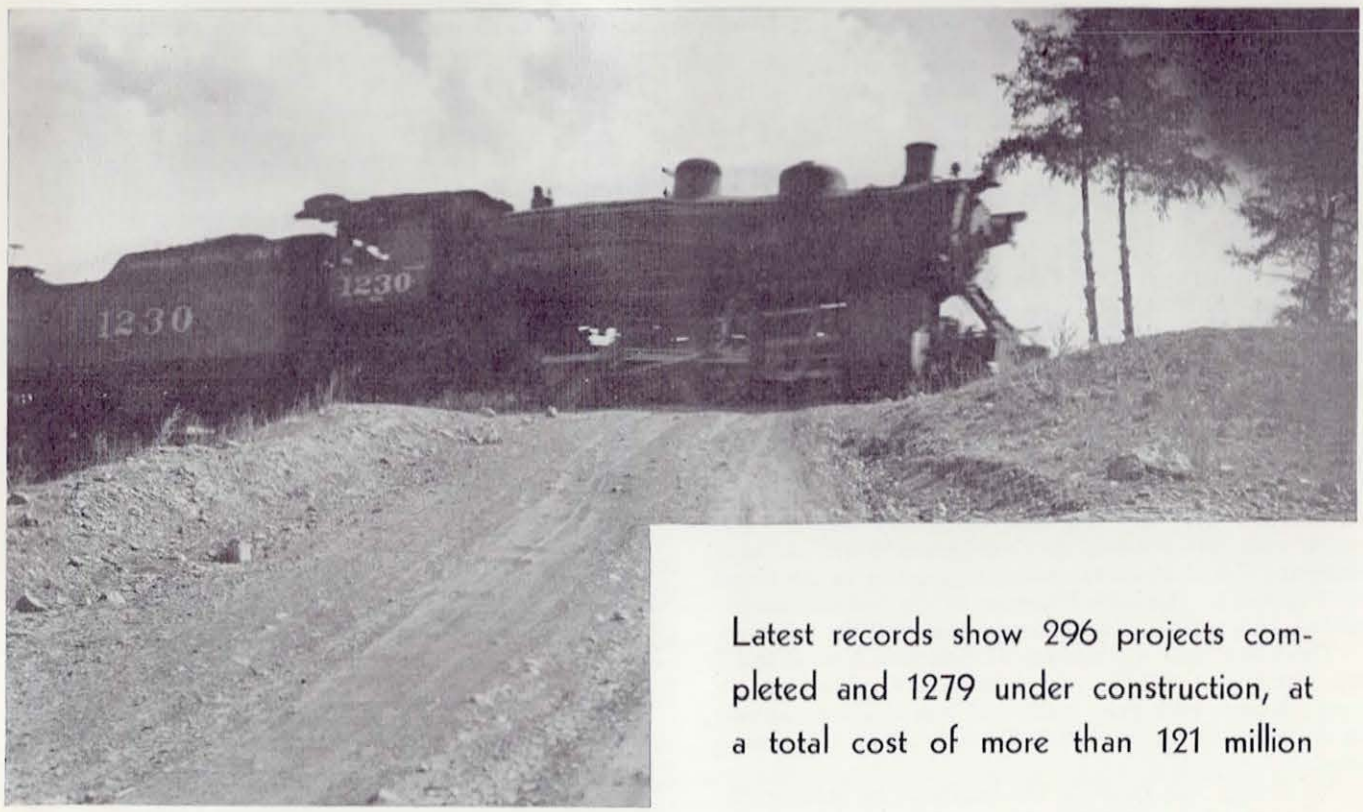
Car Loading in Canada

Car loadings in Canada for the week ended August 29 amounted to 55,641 as against 47,380 for the corresponding week last year and 52,468 for the previous week, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
August 29, 1936	55,641	21,078
August 22, 1936	52,468	21,285
August 15, 1936	50,368	20,680
August 31, 1935	47,380	18,229
Cumulative Totals for Canada:		
August 29, 1936	1,558,096	805,386
August 31, 1935	1,505,891	744,787
September 1, 1934	1,496,057	772,785

THE FASTEST RAIL TIME ever achieved on the run between Glasgow and London, and one of the world's fastest rail runs by a steam train, will be recorded when the Royal Scot of the London, Midland and Scottish, starts its new winter schedule, on September 28, 1936, says a recent statement from the Associated British Railways, Inc., New York. The Scottish flyer, already celebrated for speed, the statement says, will cut 15 minutes from its present time, leaving Glasgow and Edinburgh daily at 10:00 a.m. and arriving at Euston, London, at 5:25 p.m., making the run from Glasgow to London 401 miles in 445 minutes.

Real Progress Being Made in Federal Grade Crossing Program



2,000 or More Grade Crossings Will be Eliminated in the Federal Program*

Latest records show 296 projects completed and 1279 under construction, at a total cost of more than 121 million

TWELVE months ago, the railroads, in spite of the federal appropriation of $200,000,000 for grade crossing elimination and protection provided for in the Emergency Relief Appropriation Act of 1935, were almost in dispair of ever seeing any constructive grade crossing work accomplished with the federal funds. At that time nearly five months had passed since the funds had been made available and there was the first shovel of dirt yet to be turned.

Today, however, one year later, according to data compiled by the United States Bureau of Public Roads as of August 31, grade crossing projects to the extent of $11,407,438 have already been completed under the federal program, and another group of projects involving an estimated expenditure of $110,161,184 is under construction. In addition, still another $30,366,939 has been definitely assigned to projects approved and expected to be put under way at an early date. In other words, during the last 12 months, approximately 60 per cent of the $200,000,000 federal fund has been put to work, and another 15 per cent is on its way to early use. Furthermore, the prospects are that the remaining 25 per cent will be definitely assigned within the next three or four months, and will be largely spent within the next eight or ten.

The sudden change which occurred in the status of the federal grade crossing program is only too familiar to railway men, many of whom had, for months, been concentrating upon grade crossing separation and protection programs and upon plans and specifications for individual projects in order that construction could be started at the earliest possible date.

In an apparently over-zealous attempt to increase and spread employment among those on relief rolls, certain of the rules promulgated for the federal grade crossing work were wholly impracticable of application and, at best, promised to admit of only minor projects in which hand labor could play a predominating part. The most inept of these rules was that which established a $1400-per-man-per-year limit for labor, materials and all other items, or the alternative requirement that 40 per cent of the total cost of the project, including the cost of private property necessary to acquire in undertaking the project, must go to persons directly employed on the project in the field operations.

Largely upon the initiative and effort of the U. S. Bureau of Public Roads, under Thomas H. MacDonald, chief, to which was delegated the distribution and supervision of spending of the work-relief funds for grade crossing work, this rule, as well as subsequent alternate specifications calling for state participation and setting up a 90 per cent relief roll-labor requirement, were revoked or altered in an attempt to provide a workable basis for carrying out the work. Announcement to this effect, which was made on August 29 of last year,

* All Photographs by Courtesy U. S. Bureau of Public Roads.

almost five months after the money for grade crossing work had been made available by Congress, and approximately six weeks after the initial appearance of the rules, was virtually the "starting gun" for the large-scale operations which have since been under way.

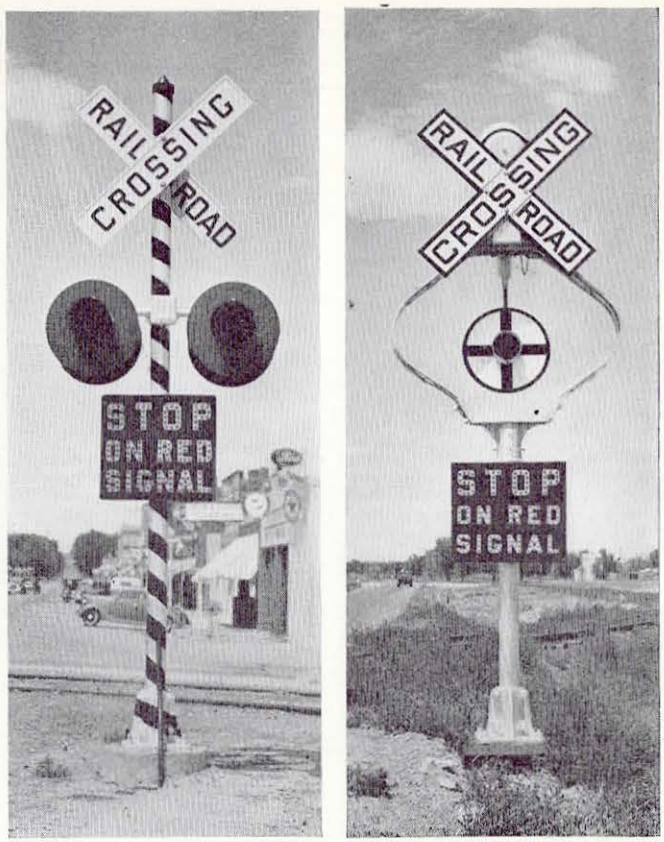
Modified Rules Cause Spurt

Almost immediately the program forged ahead. By December 23, 1935, plans, specifications and estimates covering 595 projects, estimated to cost approximately $51,127,000 had been approved. Of these, 311 projects had been placed under contract and 177 were actually under construction. Pressing forward with the program, by June 30, projects estimated to cost $136,758,582 had been approved, $92,210,762 worth of work was under construction, and work to the amount of $3,234,563 had already been completed.

At the time of the last report, issued August 31, 250 grade crossings had actually been eliminated through separation of grades or the relocation of highways, 12 grade crossings had been afforded signal protection, and 34 existing structures separating railway-highway grades had been reconstructed to meet modern requirements, at a total cost of $11,407,438. At the same time, elimination or relocation work was under way at 1,093 other crossings, 153 existing structures were being rebuilt, and signal installations were being made at 33 crossings, at a combined estimated cost of $110,-161,184. Added to this, plans had been approved for the elimination of 305 additional grade crossings through separation or relocation, for the reconstruction or replacing of structures at 45 crossings, and for the installation of signal protection at 581 crossings, at a total estimated cost of $30,366,939. By August 31, there remained a balance of only $47,387,662 of the federal money available for new work. That even this remained is not pleasing to the Bureau of Public Roads, which has, through co-operation with the states and the railways, endeavored to put the full amount of available funds to work at the earliest possible date.

Progress More Rapid in Some States

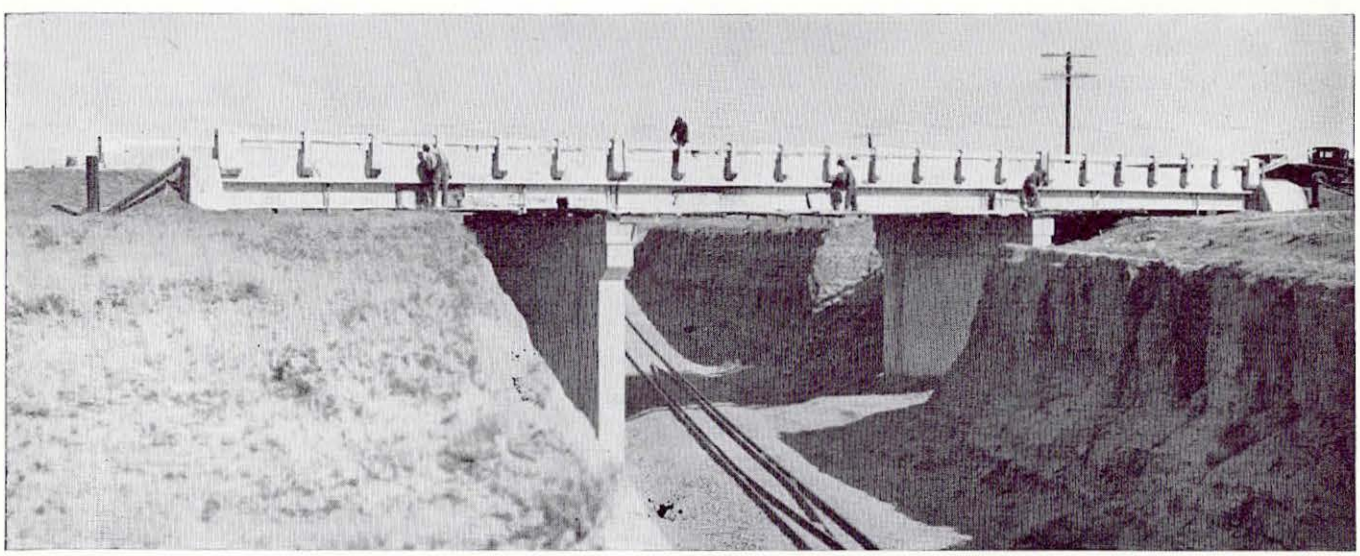
Analysis of the accompanying table presenting the status of the federal grade crossing program shows that Kansas, Nevada and Oregon were the first states to have their full programs approved, while those states which have led in the matter of completed elimination projects through grade separation and relocation, are



Two Types of Approved Crossing Signals. Left is on the Chicago, Burlington & Quincy, and Right is on the Union Pacific

Minnesota, with 23 crossings, Texas, with 18 crossings, and Arkansas, Montana and Oklahoma, each with 17 crossings. The states with the largest number of separation or relocation projects completed or under construction are Texas, with 106 projects; Iowa, with 78 projects; Minnesota, with 76 projects, and Nebraska, with 69 projects.

While the number of projects completed or under construction is, obviously, an indication of the degree of co-operation with the federal grade crossing program, it does not indicate necessarily that those states with the largest number of projects completed or under way have extended the largest degree of co-operation or have made the maximum progress under the program.



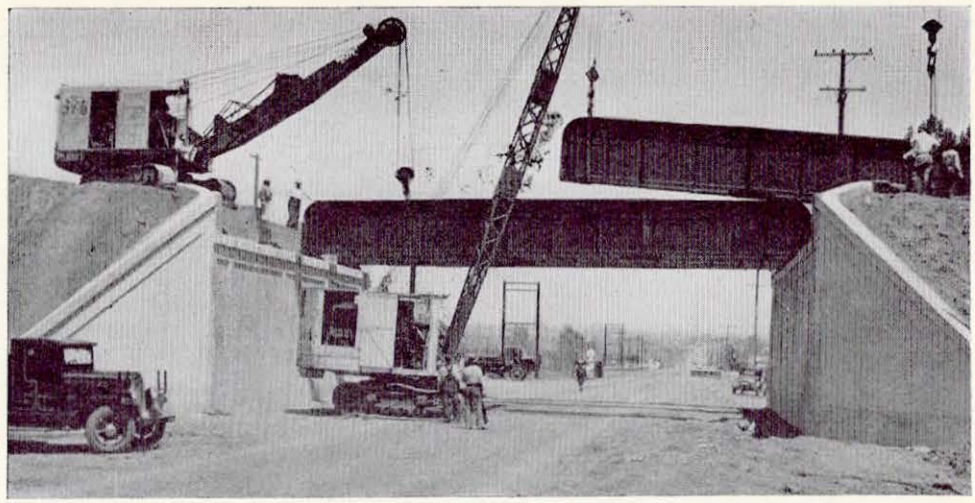
A Completed Federal Program Grade Separation Project on the Main Line of the Santa Fe in New Mexico

Current Status of United States Works Program Grade Crossing Projects

(As Provided by the Emergency Relief Appropriation Act of 1935)

AS OF AUGUST 31, 1936

State	Apportionment	Completed: Estimated Total Cost	Completed: Works Program Funds	Completed: Number: Grade Crossings Eliminated by Separation or Relocation	Completed: Number: Grade Crossing Structures Reconstructed	Completed: Number: Grade Crossings Protected by Signals or Otherwise	Under Construction: Estimated Total Cost	Under Construction: Works Program Funds	Under Construction: Number: Grade Crossings Eliminated by Separation or Relocation	Under Construction: Number: Grade Crossing Structures Reconstructed	Under Construction: Number: Grade Crossings Protected by Signals or Otherwise	Approved for Construction: Estimated Total Cost	Approved for Construction: Works Program Funds	Approved for Construction: Number: Grade Crossings Eliminated by Separation or Relocation	Approved for Construction: Number: Grade Crossing Structures Reconstructed	Approved for Construction: Number: Grade Crossings Protected by Signals or Otherwise	Balance of Funds Available for New Projects
Alabama	$4,034,617	$94,744	$94,744	2	..	..	$3,202,207	$3,202,207	33	..	1	$597,427	$597,427	6	..	10	$140,239
Arizona	1,256,099	398,678	394,444	5	..	..	650,897	639,452	6	..	..	86,220	63,832	1	..	..	158,371
Arkansas	3,574,060	635,497	633,117	17	1	..	1,767,605	1,763,489	25	4	..	1,035,487	1,033,353	14	..	29	144,101
California	7,486,362	639,111	626,616	7	4	..	6,775,110	6,543,321	45	3	..	.....	.....	..	..	..	316,426
Colorado	2,631,567	684,147	663,147	12	..	..	839,851	839,851	11	..	..	41,994	41,994	..	1	..	1,086,575
Connecticut	1,712,684	.....	.....	..	..	..	68,067	68,067	..	1	..	578,069	505,991	3	1	..	1,138,626
Delaware	418,239	.....	.....	..	..	..	143,486	120,000	1	..	..	.....	.....	..	..	..	298,239
Florida	2,827,883	284,120	284,120	2	2	..	1,562,718	1,560,407	16	3	..	309,257	309,257	9	..	..	674,099
Georgia	4,895,949	.....	.....	..	..	..	304,545	304,545	6	1	..	309,863	309,863	10	..	..	4,281,541
Idaho	1,674,479	361,899	361,899	7	..	..	754,934	754,934	10	1	..	8,732	8,732	..	..	4	548,914
Illinois	10,307,184	266,677	266,677	8	..	..	7,035,438	7,035,438	46	3	..	788,738	788,738	7	..	..	2,216,331
Indiana	5,111,096	4,202	4,202	1	..	..	4,866,887	4,743,768	36	11	..	413,314	89,585	..	..	161	273,541
Iowa	5,600,679	253,060	241,000	7	2	..	3,597,738	3,521,397	71	7	..	1,238,847	1,233,797	19	1	6	604,485
Kansas	5,246,258	219,579	219,579	3	..	..	4,892,292	4,892,292	48	1	..	134,387	134,387	2	..	3	.....
Kentucky	3,672,387	15,290	15,290	1	..	..	2,506,758	2,217,026	20	..	..	195,636	195,636	2	3	..	1,244,435
Louisiana	3,213,467	.....	.....	..	..	..	814,208	814,208	7	1	..	1,594,628	1,550,163	14	3	..	849,097
Maine	1,426,861	176,568	176,235	5	..	..	595,651	595,060	11	..	..	406,267	406,267	3	..	2	249,300
Maryland	2,061,751	.....	.....	..	..	..	408,723	408,723	3	2	..	1,070,839	1,040,332	4	2	17	612,696
Masssachusetts	4,210,833	10,069	10,069	1	..	..	1,662,731	1,662,731	12	2	..	695,455	695,455	6	..	..	1,842,577
Michigan	6,765,197	816,125	816,125	10	3	..	5,332,927	5,288,427	32	4	..	.....	.....	..	..	..	660,645
Minnesota	5,395,441	555,434	555,434	23	..	9	3,413,077	3,407,027	53	9	22	610,990	610,990	7	..	10	821,990
Mississippi	3,241,475	25,677	25,677	2	1	..	2,048,953	2,048,953	42	2	..	383,843	383,843	4	..	1	783,002
Missouri	6,142,153	45,994	45,994	1	..	..	5,473,454	5,406,570	39	..	..	788,008	665,674	6	..	2	23,915
Montana	2,722,327	1,164,330	1,164,330	17	4	..	1,429,652	1,429,652	19	2	..	.....	.....	..	..	..	128,345
Nebraska	3,556,441	418,265	418,265	13	..	..	1,748,130	1,748,130	56	1	5	1,270,689	1,270,689	10	1	18	119,356
Nevada	887,260	306,096	306,096	7	..	..	397,409	397,409	3	..	..	205,556	183,755	1	..	5	.....
New Hampshire	822,484	34,094	34,094	1	..	..	417,861	417,861	2	4	1	12,337	12,337	..	..	..	358,192
New Jersey	3,983,826	.....	.....	..	..	..	1,278,281	1,278,281	7	2	..	433,620	433,620	5	..	..	2,271,925
New Mexico	1,725,286	370,259	370,259	8	..	..	629,110	629,110	4	1	..	575,874	575,874	5	..	..	150,043
New York	13,577,189	46,040	46,040	..	2	..	9,843,984	9,583,138	32	30	..	771,355	771,355	1	5	..	3,176,656
North Carolina	4,823,958	113,110	113,110	1	3	..	2,171,205	2,171,205	30	7	..	856,779	840,380	6	4	61	1,699,263
North Dakota	3,207,473	64,305	64,305	2	..	..	1,941,898	1,940,898	38	..	..	42,034	42,034	1	1	..	1,160,236
Ohio	8,439,897	.....	.....	..	..	..	2,441,311	2,294,346	16	1	..	2,572,373	2,485,784	15	4	..	3,659,767
Oklahoma	5,004,711	806,150	806,150	17	1	..	1,449,661	1,449,661	20	1	..	1,202,957	1,202,957	17	2	..	1,545,943
Oregon	2,334,204	126,698	126,698	1	2	..	2,258,196	2,133,484	15	4	..	74,022	74,022	1	..	2	.....
Pennsylvania	11,483,613	152,737	121,370	12	..	..	4,558,765	4,241,594	35	10	..	2,256,893	1,919,528	11	5	..	5,201,120
Rhode Island	699,691	236,879	236,879	..	1	..	418,195	417,129	4	..	..	.....	.....	..	..	..	45,683
South Carolina	3,059,956	154,754	151,450	3	..	1	1,210,424	1,202,722	24	5	2	580,239	579,829	11	..	32	1,125,955
South Dakota	3,249,086	188,494	188,494	10	..	..	1,033,679	1,033,679	23	..	..	722,742	722,742	14	1	19	1,304,171
Tennessee	3,903,979	28,389	28,389	1	..	2	527,940	527,940	11	1	..	1,479,064	1,479,064	18	1	18	1,868,586
Texas	10,855,982	699,096	699,096	18	2	..	7,463,176	7,456,802	88	11	..	2,435,354	2,382,315	18	2	150	317,769
Utah	1,230,763	31,147	29,757	..	1	..	608,107	608,107	9	..	..	305,778	265,000	3	..	..	327,899
Vermont	729,857	164,678	164,678	3	3	..	297,333	295,975	4	2	..	283,298	221,830	3	1	11	47,375
Virginia	3,774,287	172,632	172,632	11	..	..	1,577,240	1,465,216	25	2	..	828,230	828,230	18	4	11	1,308,209
Washington	3,095,041	276,868	272,068	5	2	..	2,066,935	2,066,903	11	7	2	510,695	510,695	6	2	5	245,375
West Virginia	2,677,937	.....	.....	..	..	..	426,806	426,806	4	1	..	908,973	908,973	16	1	4	1,342,157
Wisconsin	5,022,683	310,180	310,180	4	..	..	3,789,631	3,789,631	28	6	..	318,308	286,040	4	..	..	636,832
Wyoming	1,360,841	55,366	55,365	2	..	..	736,216	736,211	6	..	..	205,606	205,605	2	..	..	363,660
Dist. of Columbia	410,804	.....	.....	..	..	..	425,564	396,804	3	..	..	.....	.....	..	..	....	14,000
Hawaii	453,703	.....	.....	..	..	..	296,218	295,333	3	..	..	226,162	158,370	2	..	..	.....
Totals	$196,000,000	$11,407,438	$11,314,074	250	34	12	$110,161,184	$108,271,920	1,093	153	33	$30,366,939	$29,026,344	305	45	581	$47,387,662



One of the Federal Program Eliminations in Denver, Colo., Involving the Denver & Salt Lake and Colorado & Southern

In any observation to this end, consideration must be given not alone to the number of projects undertaken, but to the character of the projects and to the types and size of structures being built.

Grade separation projects in rural areas involving relatively simple structures are obviously more readily developed, approved, undertaken and completed than large complicated projects in urban areas, which may involve not only more than one sizable structure, but also the purchase of right-of-way and the settlement of damages, not to mention differences of opinion among the many parties interested or directly concerned. Unquestionably, these factors are reflected in the status of the program in New York state, where, for example, in spite of the fact that no projects have been completed to date, 32 separation or relocation projects are under way at an estimated cost of $9,843,984, an amount more than a million and one half more than the estimated cost of the 106 projects completed or under way in Texas. Similarly, Illinois, Michigan and Wisconsin have made creditable progress, each with large numbers of projects under way, although the projects completed to date number only 8, 10 and 4, respectively.

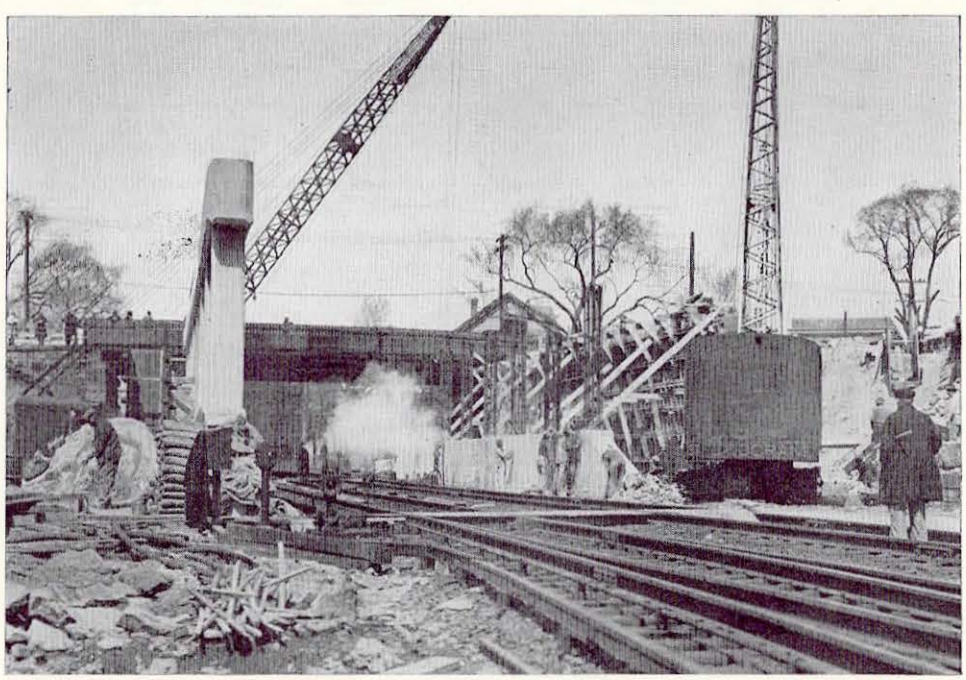
Some states have made rather noticeable lack of progress, these including Connecticut, Ohio, Georgia and Louisiana, where, with a total of approximately $18,260,000 available for grade crossing work, no work has been completed, and only 29 separation or relocation projects, and 4 reconstruction projects, involving a total expenditure of approximately 3½ million, are under construction. This lack of progress in certain states is attributed to various factors, some political, at least indirectly, while in other cases it is attributed largely to lack of initiative or organization on the part of the state highway departments.

In spite of the delay in getting the program under way in certain of the states, and the increased problems which are anticipated as the final determination of what crossings are to be included in the remainder of the program must be made, it is expected by the Bureau that the unassigned balance of the federal funds will have been definitely assigned by early spring, and that the projects involved will be under construction well before next summer. As a matter of fact, under the terms of the Emergency Relief Appropriation Act of 1935, it is necessary that all of the funds be spent by July 1, the end of the government fiscal year 1936.

Costs Vary Widely

With the completion of the program, it is expected that more than 2,000 grade crossings will have been

(*Continued on page 383*)



The Large Federal Program Elimination on the New Haven at Providence, R. I., is Typical of Some of the Heavier Work Being Done

Track Tests of Electric Locomotives

Measurements made with Brinell recording ties show how lateral forces may be controlled

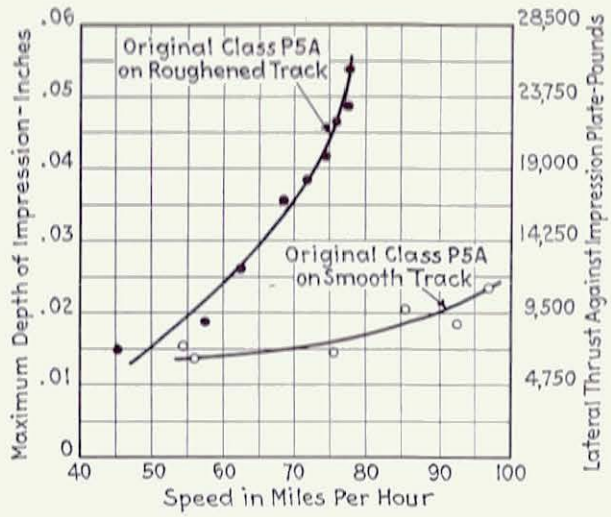
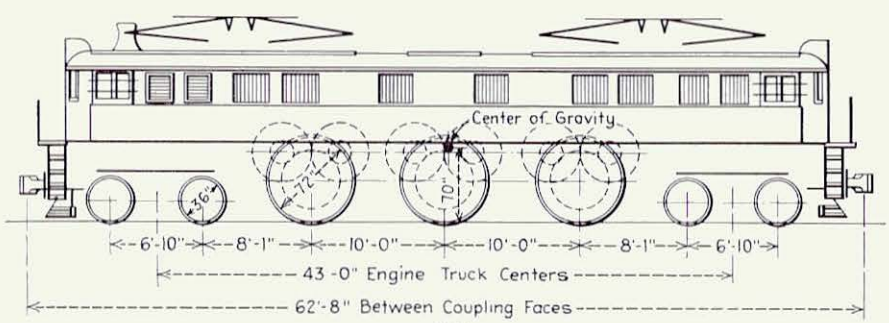


FIG. 1—Record of Lateral Forces Caused by the Original P5A on Rough and Smooth Track

TRACK tests of electric locomotives conducted by the Pennsylvania Railroad, in conjunction with the General Electric Company and the Westinghouse Electric & Manufacturing Company, were in a large measure responsible for the design of electric locomotives now in service on the Pennsylvania. The tests which resulted in the developing of new techniques are applicable to all types of motive power and rolling stock. They show definitely what speeds are permissible without risk of damage to the track by lateral forces which the wheels exert against the rail.

For the purpose of accurately measuring these forces, the technical staff of the Pennsylvania Railroad originated and developed an adaptation of the Brinell hardness method to be used on the ties in the track. The first stretch of Brinell track was installed and used during 1907. The speed and weight of locomotives continued to increase and the Brinell ties were subsequently used for investigations during 1910, 1912, and 1924 at various locations on the railroad.

The tests were started early in 1933 and continued for nearly two years in anticipation of high-speed operation over the electrified portion of the Pennsylvania, between New York and Washington, D. C. Not only was the Brinell test track used but collaboration was secured from the General Electric Company and the Westinghouse Electric & Manufacturing Company, the former providing electric strain gages applied at the ends of



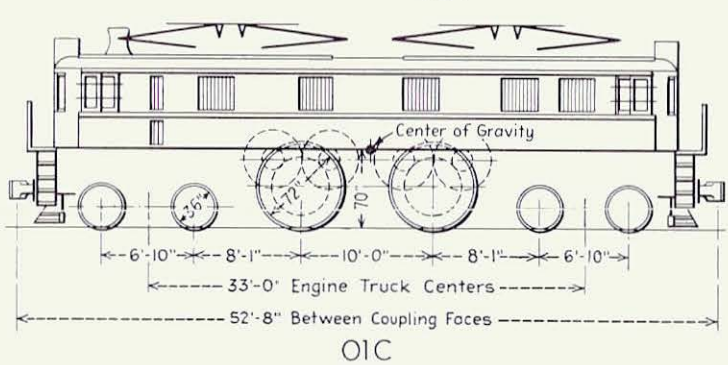
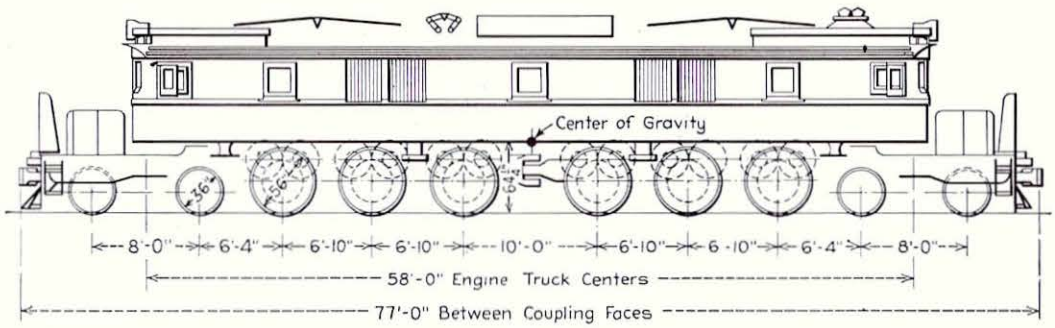
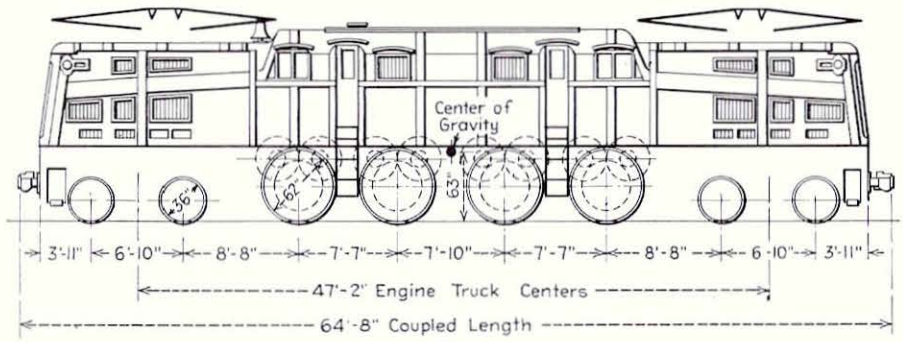


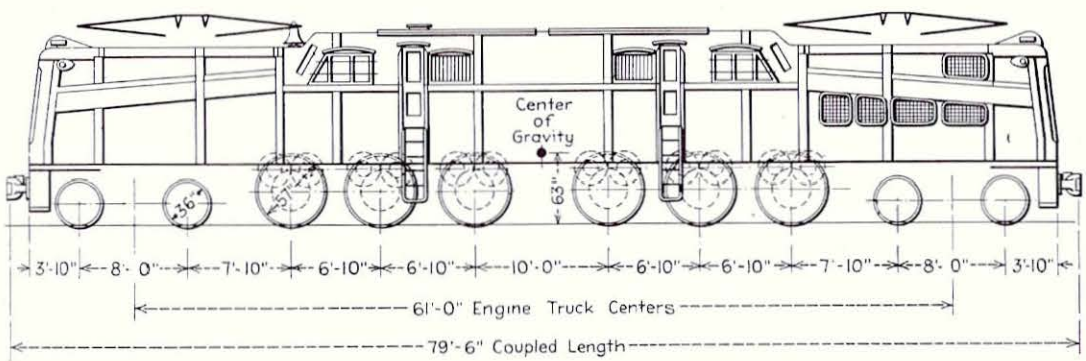
FIG. 2—The Drawings at the Left and on the Next Page Show the Principal Dimensions of the Five Electric Locomotives and the K4s Steam Locomotive Run in Comparative Tests



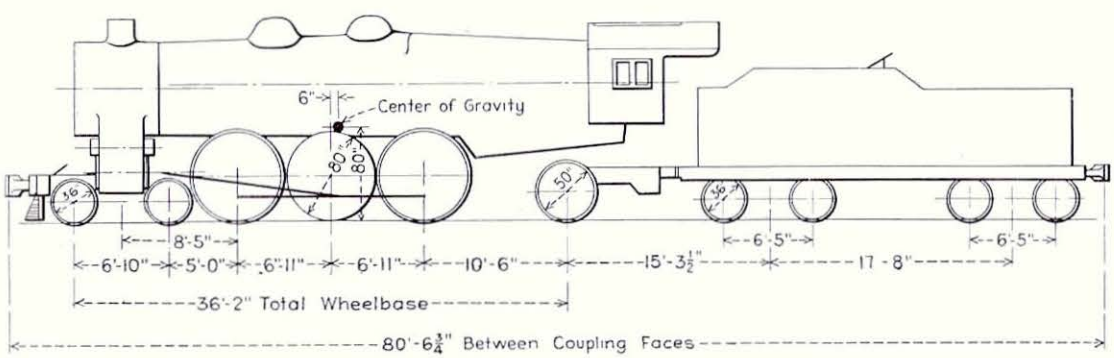
N. Y. N. H. & H. R. R.



R1



GG1



K4s

the locomotive axles, and the latter, electrically-operated instruments recording the movement of various locomotive parts or their rate of acceleration.

Two independent methods of measuring the lateral thrust were used, one employed a track instrument by which impressions were made in soft steel plates by a Brinell ball, and the other a strain gage applied at the ends of each axle. The two methods supplement each other in measuring the extent and location of the lateral forces, the former being fixed in position on the rail and confined to a short stretch of track, while the latter is applied to the locomotive and may be used over any distance in measuring forces developed on curves or tangent track as well as at frogs, switches and other special track construction. Each has its limitations.

The track device does not identify the individual wheel which exerts the greatest thrust but has proven to be a reliable means of measuring the maximum lateral force exerted by the rail supports, while the strain gage instrument measures pressure at the end of the axle but

does not measure whatever track force is due to the mass of the wheels and axle.

Locomotives Tested

The main object of the tests was to measure the lateral forces on the rail supports produced by the class P5A electric locomotive, and to find out what changes in this locomotive would reduce these forces. Locomotives of 11 different classes, both steam and electric, were tested and much information of value was obtained regarding their action. Nearly 1800 test runs were made with these locomotives. In general, the results from the steam locomotives and from two of the electrics are not comparable with those made at high speed by the class P5A, and the following data covers only the five locomotives with which the tests were principally concerned. They are all 11,000-volt, single-phase, electric passenger locomotives designed for high speed.

Class P5A

The class P5A locomotive has a 2-C-2 wheel arrangement; a rigid wheelbase of 20 ft. 0 in.; and overall length of 62 ft. 8 in.; a horsepower of 3,750 at the rail and a maximum speed of 90 m.p.h. The total weight at the time of the tests was 386,000 lb.

Class O1C

The class O1C locomotive, type 2-B-2 is similar to the P5A in all particulars, but has two instead of three driving axles, with a correspondingly shorter length and lesser weight and power. The total weight is 300,000 lb.

The locomotives of classes P5A and O1C were designed and built for the electrified lines between New York and Washington, and had been in use for several months between New York and Wilmington when these tests began.

N. Y., N. H. & H. Locomotive

The New Haven locomotive has a 2-C + C-2 wheel arrangement. Unlike the P5A, it is articulated. The rigid wheelbase is 13 ft. 8 in.; the overall length 77 ft. 0 in. The horsepower at the rail is 3,300 and the maximum speed 100 m.p.h., the latter being obtained by the use of special gears. The total weight is 403,500 lb. The locomotive was one of ten which have been in service on the New Haven road since 1931.

Class R1

The class R1 locomotive has a 2-D-2 wheel arrangement. It is similar to the P5A, except that it has one more pair of driving wheels, a longer wheelbase, additional weight and greater horsepower. The rigid wheelbase is 23 ft. 0 in.; the overall length 64 ft. 8 in.; the horsepower at the rail is 5,000 and the maximum speed 100 m.p.h. The total weight is 402,000 lb. The two middle pairs of driving wheels of this locomotive have flanged tires with a lateral clearance in the frame of $1\frac{15}{16}$ in. so that, normally, they had no effect in guiding the locomotive.

Class GG1

The class GG1 locomotive which is shown is an articu-

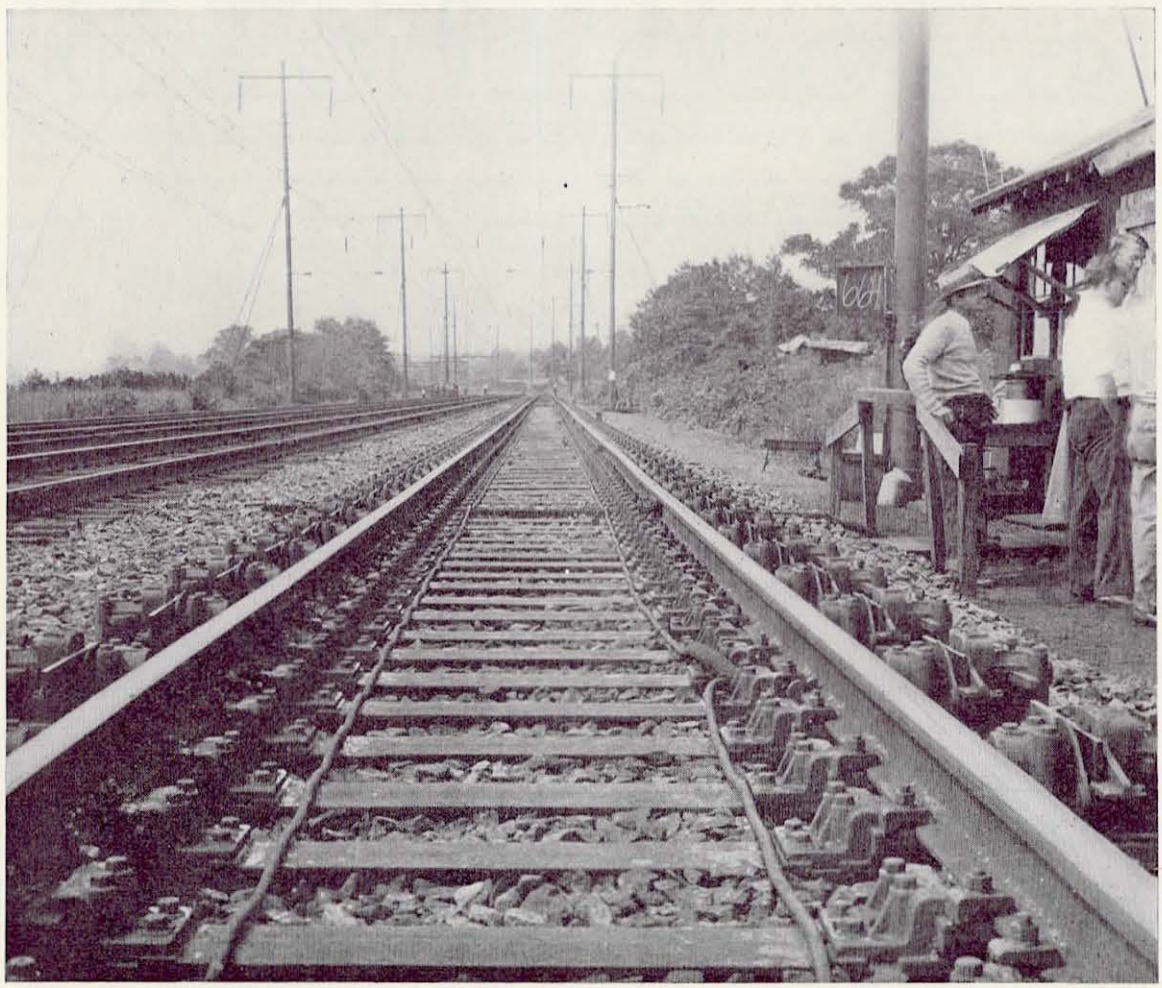


FIG. 3—The Test Track Near Claymont, Del., Showing Rough Irregularities in the Vertical Plane

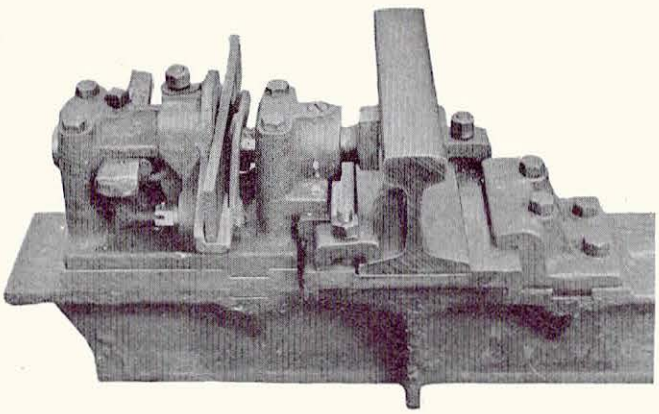


FIG. 4—One End of a Brinell Tie Showing the Recording Head

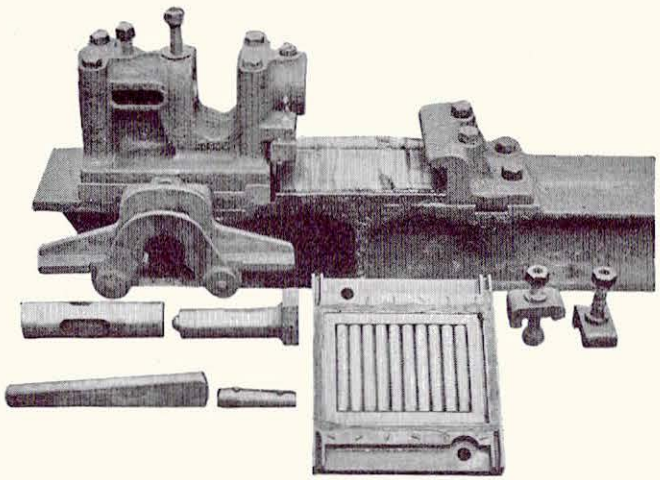


FIG. 5—Recording Head with Parts Separated

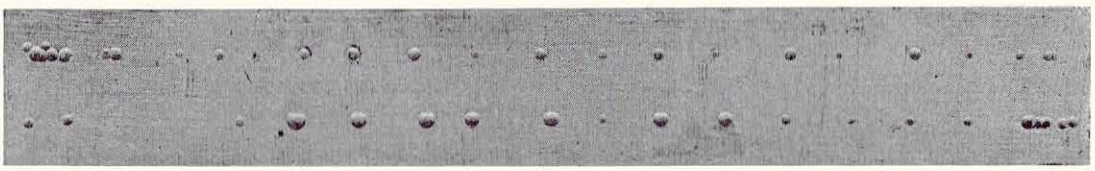


FIG. 6—Impression Plate Showing Marks Made by Brinell Ball

lated locomotive similar to the New Haven but larger. The wheel arrangement is 2-C + C-2; the rigid wheelbase 13 ft. 8 in.; the overall length 79 ft. 6 in. The horsepower at the rail is 4,620; the maximum speed 100 m.p.h. The total weight is 475,000 lb.

The R1 and GG1 were designed after the tests of the P5A and had features found to be desirable for high speed as a result of the tests. One of each was constructed and tested.

The Test Track

The track was located in the No. 4 or southbound passenger track of the Maryland division, near Claymont, Del., and extended for a distance of 440 ft. On this portion of the railroad, the rails were 130 lb. Pennsylvania section, in good condition and aside from the test track, were laid on tie plates on wooden ties in stone ballast.

At the test track, the wooden ties were removed and the rail was relaid on 249 metal ties, every other one of which was fitted with apparatus to measure and record the lateral thrust. At both ends of each recording tie, plungers which are free to move longitudinally in their bearings, press against the heads of the rails. A hardened steel ball 1 in. in diameter is placed in the opposite end of the plunger and bears against a piece of annealed boiler plate supported by a suitable bracket. This impression plate is brought into contact with the ball by another plunger, which is driven up by a wedge.

When a locomotive passes over the test track, the lateral blows from the wheels force the hardened steel ball into the soft steel plate and the force of the maximum blow at each recording tie is measured by the depth of the impression. The depth of impression of a Brinell ball varies directly with the force on the ball. The Brinell ball has another valuable characteristic which makes its use practical in this apparatus; if the ball is subjected to repeated blows of varying magnitude, the depth of impression is the same as would have been made by the maximum blow acting alone.

At each tie, both recording and non-recording, the rails were supported by roller bearings which offer negligible resistance to the lateral movement of the rail. Neglecting the small friction of the roller bearings, the only forces resisting the outward movement of the rail are those passing through the Brinell ball. The impression plates must therefore record the maximum force required to resist the outward movement of the rail when it is struck lateral blows by a passing locomotive. The track gage was set and maintained throughout the tests at 4 ft. 8½ in.

The speed over the test track was measured by a chronograph located in the test house alongside the track actuated by circuit breakers along the track which were operated by the locomotive in passing.

Tests on Brinell Tie Track

The test track was at first installed with good line and surface and, when the original class P5A (type 2-C-2) electric locomotive was run over it at a speed of nearly 100 m.p.h., only light lateral blows were recorded. It was evident, therefore, that the oscillations to produce heavy blows could be set up only by roughening the track.

There is no way of knowing how rought the test track should be to represent the poorest piece of main line track that may ever be run over by a locomotive at high speed. In these tests, the intention was to roughen the track enough to make it possible to show differences in maximum permissible speed between the original P5A and the locomotives incorporating trial changes without running at speeds higher than 100 m.p.h. Low humps were built into the track by tamping and consolidating the ballast at certain points and

these irregularities were maintained during all subsequent tests.

Before run 45, the test track was hand tamped to make a number of humps from ⅛ in. to ¼ in. high, but when the locomotive was run over it at a speed of 102 m.p.h., the maximum depth of impression was only 0.045 in. On the following day, humps were put in the track at three places in the right rail and at three in the left. A little later a fourth was added in the left rail. Throughout the series of tests, humps were maintained at these places.

At first, the degree of roughness of the track changed rapidly, sometimes by a noticeable amount, in one day. As the sub-grade and the ballast under the ties became more compact, the rate of change was much slower. The roughness of the test track depends, not only on the cross levels, but also upon the rate of runout of the humps and the firmness of the foundation under the track.

To have an exact basis of comparison between test runs on different days, an original class P5A locomotive was run over the test track each day. The degree of roughness of the track was indicated by the speed at which this locomotive reached 0.05 in. maximum depth of impression, corresponding to a force of approximately 23,750 lb. against the impression plate.

The test track appeared to be a great deal rougher than any main line passenger track. It should be remembered, however, that ordinary track is rough, usually as the result of soft spots under the ties and that the difference in level of the two rails may be much larger with a locomotive on the track than it is when seen by an observer without any load on it.

Limiting Size of Lateral Blows

In the early days of the test, it was thought that the speed over the track should be increased until the maximum depth of impression on the record plates was 0.04 in. As no distortion of the track resulted from blows of this magnitude, the maximum test speed was gradually increased, because a comparison based on blows almost large enough to cause track displacement is, obviously, of more value than one based on smaller blows. Normally, when the maximum depth of impression reached 0.05 in. there was no further increase in speed because at this time the depths of the impressions were increasing rapidly for a small increase in speed, and it was evident that the locomotive had nearly reached the speed at which track displacement would take place on this roughened track.

Control Locomotive

Class P5A locomotive No. 4736 was maintained during the tests in its original condition, as of April, 1933, when the tests were started, and was used as a control or check against results obtained with other locomotives on which changes were made.

It will be noted from the curves that the lateral forces developed by the P5A on rough track do not increase in direct proportion to the speed. At lower speeds, the rate of increase is small and it gradually increases until at the higher speeds the curve is almost vertical, and it was evident that the track would be damaged at a slightly higher speed. Throughout the long series of tests, the maximum safe speed of the P5A increased or decreased with the degree of roughness of the track, but always at the higher speeds the

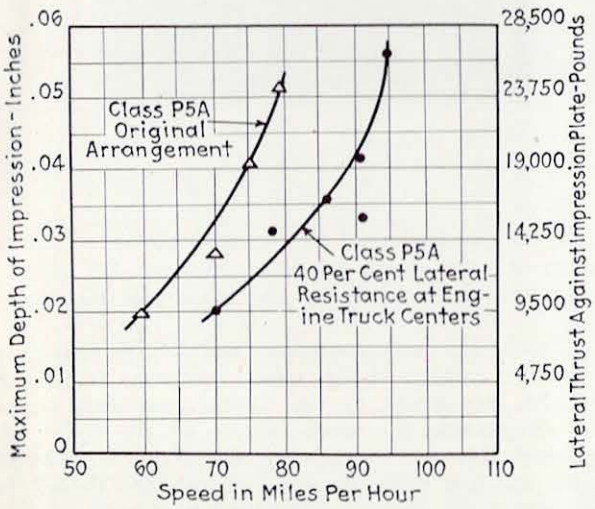


FIG. 7—Effect of Low and High Resistance at Engine Truck Center—Class P5A Locomotive on Test Truck

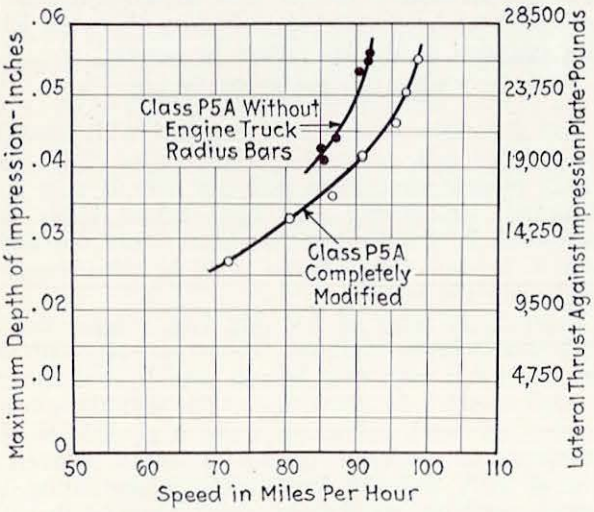


FIG. 8—Test Track Performance of the P5A Locomotive With and Without Radius Bars

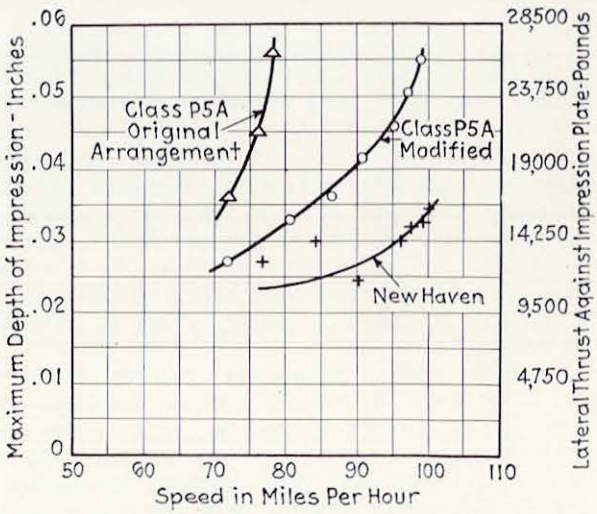


FIG. 9—Test Track Performance of Original and Modified Class P5A and New Haven Locomotives

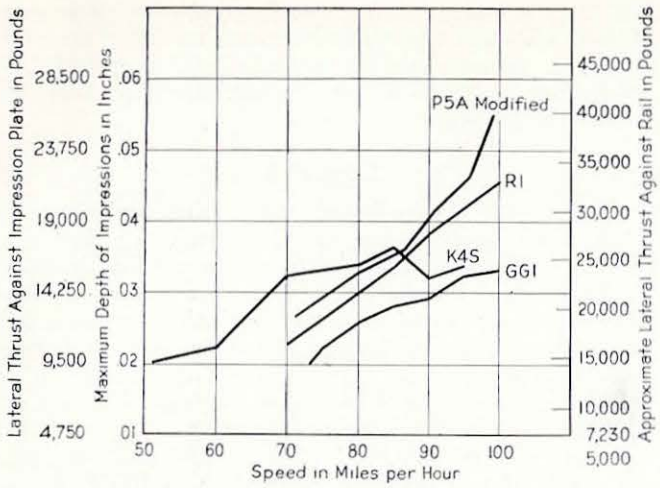


FIG. 10—Ratio of Maximum Lateral Forces to Speed for One Steam and Three Electric Locomotives

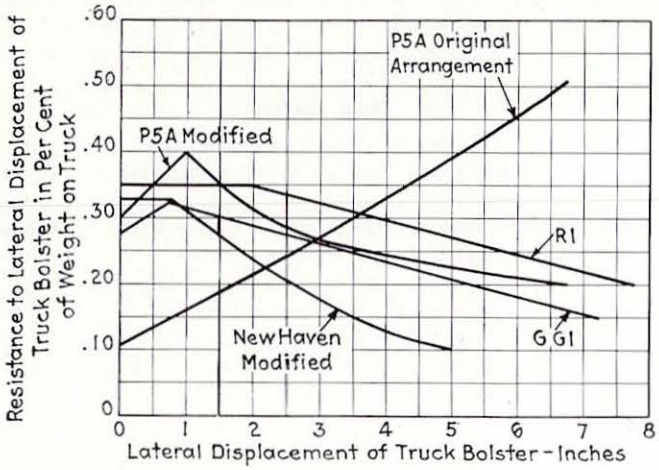


FIG. 11—Variation of Truck Resistance With Lateral Displacement

curve showing maximum lateral forces is nearly vertical. For the original P5A the curve for rough track varies very little and even when the track had been restored to a smooth surface for several months and then roughened again, the impressions could be duplicated very closely, and were a reliable standard of reference in appraising the performance of the locomotives on which changes had been made. Relative effects of this locomotive on rough and smooth track are shown in Fig. 1.

Steam Locomotives

When the tests were started, the test track had good line and surface and the lateral forces against the rail were no higher from the P5A electric than from the large steam locomotives. With a rough track, while the forces developed by the class K4s steam locomotive (type 4-6-2) were somewhat higher than on smooth track, they show no tendency to increase with the speed, but with the P5A (type 2-C-2) the lateral forces increase very rapidly at the higher speeds.

Changes in Locomotives

During the course of the tests there were applied to the P5A locomotives tested, ten different spring rigging arrangements and variations in spring flexibilities. In some of these arrangements no equalization was provided between drivers and engine truck.

Twelve different engine truck restraint devices were tried, the purpose of which was to introduce resistance to the lateral movement of the truck center or to the swiveling of the truck to damp out horizontal oscillations. Various other suggested changes when tested proved of no benefit and are, therefore, not described in this paper. The changes which appeared to be beneficial were tested repeatedly, both with No. 1 and No. 2 end of the locomotive leading, until the value of the change had been definitely determined.

Restraint at Truck Center

The original P5A locomotive had an engine truck on which the bolster was carried on tee hangers or links which resisted lateral movement of the truck center pin, the resistance beginning at 10½ per cent of the load on the truck and increasing to 51 per cent as the center moved to the limit of its swing.

40 Per Cent Resistance at Truck Center

Many tests were made with a device giving 40 per cent constant resistance to lateral motion at the truck center. This device was later adopted in similar form for the class GG1 locomotives. Over a long period of time, the use of these trucks in a P5A locomotive with the original driving and truck springs on the locomotive always improved the performance from 10.5 to 14 m.p.h. That is to say, when the original P5A was run over the test track, followed by a P5A with 40 per cent trucks, the speed of the locomotive with the high resistance trucks was as much as 14 m.p.h. higher than that of the original locomotive for the same depth of impression. Referring to Fig. 7 which shows speeds and impressions made by the original P5A, and also by one having 40 per cent lateral resistance trucks, where the original P5A makes an impression of 0.05 in. at a speed of 79 m.p.h., the 40 per cent truck locomotive was operated at 93.5 m.p.h. for the same impression, an increase of 14.5 m.p.h. The advantage of a high resistance to lateral movement at the truck center was definitely proven.

Radius Bar

Another device which gave consistently improved performance was an engine truck radius bar similar to that later adopted for the class GG1. It restrained the swiveling or turning of the truck around its center but permitted lateral swing of the truck center. In Fig. 8 the effect of the radius bars is shown when they were applied to the modified P5A. The modified locomotive which had the radius bars, shows for an impression of 0.05 in., a speed of 96.5 m.p.h. When the bars were disconnected the speed of the same locomotive for this impression was 90 m.p.h. Their use added 6.5 m.p.h. to the permissible speed over the roughened track.

Modified P5A Locomotive

As a result of the Brinell track tests and separate tests made by the Westinghouse and General Electric companies, which will be described in a subsequent issue, four changes in the P5A locomotive were decided upon as desirable. These were:

(1) *Redistribution of Weight:* The fulcrum points of the diagonal equalizers between trucks and drivers were moved toward the engine truck 9 in., or a distance sufficient to decrease the driving axle loads about 10,000 lb. and to increase the truck axle loads about 7,500 lb.

The reasons for making this change were:

The shifting of weight from the drivers to the trucks

was considered advantageous because the trucks, being farther away from the center of rotation than are the drivers, are in a more favorable position to produce frictional damping of lateral oscillations at the rail than are the drivers, and the higher the truck load the higher is the frictional damping and the consequent steadying of the locomotive against lateral oscillations.

(2) *Engine Truck Center Restraint:* Both engine trucks were fitted with lateral resistance rockers at the center pin having a crack-off or initial resistance of 30 per cent, increasing to 40 per cent during a movement of one inch and then falling to 20 per cent of the center pin load under full lateral movement. This was substituted for the original 10½ per cent initial resistance at the truck center.

The engine truck bolster restraint against lateral motion should be high at crack-off so as to provide a large lateral restraining force in order (a) to limit the amplitude of oscillation at high speed, (b) to slide the truck wheels laterally across the rail head against the tread friction, (c) to shield the rail from driving wheel blows, and (d) to guide the locomotive around curves.

(3) *Radius Bars:* There was attached to each engine truck a radius bar having its pivot point 79¾ in. inward from the truck center pin and a lateral restraint at the pivot point with a crack-off of 6,500 lb. The pivot point moved three inches laterally in each direction before the restraining force increased above 10,000 lb. This was an added feature, the original P5A truck having no radius bars.

The tests of the original P5A locomotive showed conclusively that the trucks without radius bars swiveled continuously in synchronism with the oscillations of the main frame of the locomotive and, therefore, did not produce sufficient frictional damping at the rail. In runs without radius bars, the test records show that the oscillations were more severe and more prolonged and that the rear driver blows were generally higher than for runs with the radius bars.

On switches and crossovers the radius bar increases the lateral hub forces on the leading engine truck, generally on the trailing axle, and tests were made and repeated which showed that the bar acts in the manner intended and that no binding or excess force is produced in the bar.

(4) *Spring Deflection:* Main driving axle springs with the static deflection increased from 2½ in. to 3½ in., and engine truck springs with static deflection increased from 1¼ in. to 2¼ in., were used in the modified locomotives.

The stiffness of the springs in the modified locomotive is a compromise between the most favorable condition for lateral oscillations and the most favorable condition for the cushioning of vertical and lateral blows from the track.

Brinell Track Tests—Final Results

Curves of maximum depth of impression against speed were used in comparing the results of tests of different types of locomotives on the test track, since they were felt to introduce the least number of unknown variables.

To show the approximate values of forces on the Brinell ball necessary to produce the impressions, a scale based on laboratory calibration of the Brinell ball on the plates, has been added to curves shown in this paper, but this is not an exact measure of results when moving on the test track.

In Fig. 10 is shown an additional scale of "Lateral Force Against Rail." This scale is derived from results of static calibration of the test track, made by applying static forces against the inside of the rail head. Since the track was not thus calibrated throughout the full range of impressions and since static conditions are not a true picture of running conditions, this scale is shown only to indicate approximately the magnitude of the blows on the rail which produce the blows on the impression plates.

Class P5A

Test results obtained with the original and modified P5A when operated over the test track are shown in Fig. 9. For the same depth of impression or blow against the rail, the modified locomotive can be operated at much higher speeds than the original locomotive, and it is evident that the changes have resulted in greatly improved performance. For a depth of impression of 0.035 in., the original P5A shows a speed of 71 m.p.h., and for the same impression the speed of the modified locomotive is 84 m.p.h., a gain of 13 miles per hour in speed. For a depth of impression of 0.055 in. the speed of the original P5A is 78 m.p.h., while that of the modified P5A is 99 m.p.h. Here the gain in speed is 21 m.p.h.

Class O1

The class O1 locomotive of which there are but eight in service, when modified as was the P5A, showed results very similar to those for the modified class P5A.

New Haven

The New Haven locomotives when first tested had rockers at the truck centers with an initial resistance to lateral movement of 20.5 per cent, and it registered small impressions at 100 m.p.h. Later when modified by fitting the trucks with rockers whose resistance was 33.3 per cent, and with radius bars, it gave results as shown in Fig. 9. A speed of 100 m.p.h. was reached with a maximum depth of impression of only 0.034 in. The curve of impressions rises slowly at high speeds, a very desirable characteristic.

Class R1

The curve for the class R1, Fig. 10, follows somewhat closely that of the modified P5A, but shows at 100 m.p.h. about 5 m.p.h. greater speed than the modified P5A for the same depth of impression and an improvement of about 24 m.p.h. over the original P5A. In other words, for an impression of 0.045 in. the original P5A could be operated at 76 m.p.h., and the R1 at 100 m.p.h.

Class GG1

Referring again to Fig. 10, we find that the class GG1 curve of impressions rises slowly at high speeds, as was characteristic of the New Haven locomotive which it resembles in general arrangement. It is but slightly lower than the modified P5A, Fig. 9, at 70 m.p.h., but it did not reach high impressions at any speed of the tests and at a speed above 100 m.p.h. the impression was less than 0.035 in. At 100 m.p.h., its speed was 30 m.p.h. above that of the original P5A for the same impression, and 20 m.p.h. above the speed of the modified P5A, in addition to which the curve is rising much more gradually than that of either the P5A or R1.

It is interesting to observe that the lateral forces which were measured for the modified P5A, R1 and GG1, are in the order of their static driving axle loads. These axle loads are, approximately, 75,000 lb. for the modified P5A, 60,000 lb. for the R1 and 50,000 lb. for the GG1.

(*To be continued*)

Economic Research and Transportation

Increasing need for cooperative study as well as work by individual carriers

By C. S. Duncan

Economist, Association of American Railroads

IF I am not mistaken, there is in process of crystallization a somewhat new idea in the railroad field. This idea has to do with the potential, practical value of economic research. There has appeared here and there an item of news to the effect that certain individual railroads are organizing research departments, separated from engineering research and most closely connected with traffic problems. This is economic research, as distinguished from so-called "scientific" research.

It is, then, an opportune time to examine such an idea in order to see what practical content there may be in it. This is an idea in which I have been interested for many years. It, therefore, pleases me to think that railroad officials may now be looking at this idea with a somewhat softened and a less cold and fishy eye. The resuts of my thought on this subject, for what they may be worth, are here given.

First of all, let us try to understand just what it is that we are talking about. What is this research? What is economic research? Research is nothing more nor less than a careful study of a definite problem; economic research is a careful study of an economic or business problem. The mental process of all research is the same; the subject matter dealt with classifies it as economic, mechanical, electrical, chemical, physical, biological or other research. Economics is a study of business and every business problem is, therefore, an economic problem.

The Mental Process

I have said that the mental process of research is the same, whatever kind of research is carried on. The equipment and the facilities differ in different cases. Some kinds of research require laboratories expensively equipped. There are other kinds of research confined, for the most part, in the minds of men. That mental process, which is the same for all kinds of research, may be outlined as follows:

1. *Defining the problem*: One can not say, "Go to—I'll research." There must be a clear, definite, intelligent selection of a subject; a problem clearly bounded on the north, south, east and west. No one can carry on research in a vacuum. Loosely, carelessly, vaguely defined problems have the effect of wasteful methods, the accumulation of useless, unco-ordinated data, cloudy analysis, general and impractical conclusions. Such research loses itself in the desert sands of generalization. The first step, therefore, is a clear definition of the problem.

The process of definition may be illustrated in this way: Suppose a traffic department on a given railroad undertakes to set up a research department. Assume that it is set up and ready to function. It wants to go to work. What shall it work at? Well, presumably, it will be expected to deal with traffic problems. They are many and varied. Essentially, of course, the traffic manager wants to secure an increasing volume of traffic at remunerative rates or, at least, to maintain the volume of traffic now moving over his lines. This traffic obviously divides itself at once into passenger and freight. Passenger traffic is for the moment set to one side; freight is considered.

Narrowing the Problem

But freight is the whole volume of goods moving from origin to market. It is, however, classified in reports to the Commission into various broad groups and into smaller or individual groups. Even a cursory examination reveals the volume and revenue earned by this classification. The standardized and uniform reports required of rail carriers by the Interstate Commerce Commission afford ample material for comparative volume by commodities and comparative revenues earned. It may, therefore, be discovered that a substantial volume of lucrative freight of one particular kind, say, petroleum, has been slipping away. We are now nearing a definite problem. We want to know why the decrease in volume. Has the supply diminished? Is it moving elsewhere? Has it been diverted? If diverted, to what transport agency? What facts have influenced diversion? Are there changes in marketing methods? Under the conditions as they are found, what may be done, if anything, to retain existing traffic and recover at least a part of that loss?

The problem is in this way narrowed and defined within such limits as become suitable for research. From the point of view of a given railroad, the movement of a given commodity may be thus studied. The subject for research, then, becomes "Petroleum and Petroleum Products; Transportation and Marketing."

2. *Assembling the facts*: The second step in research is to assemble all available, pertinent facts. The primary requisite here is to know the sources of data, such as government documents and reports, business sources, special studies and investigations. Knowledge of historical facts, of the development of the industry, of changes in production, of changes in methods of distribution, of changes in markets, of the growth and decline of competitive substitutes, is essential.

Several years ago I published a book on the subject of business research, in which I undertook to demonstrate that every business problem contained within it three issues, namely, issues of fact, issues of principle and issues of policy. In other words, if the business manager knows the facts, applies to them correctly the proper economic principles, he will then be in a position to determine a sound policy. Furthermore, every commodity, of whatever kind, that enters the stream of commerce can be most effectively studied from three points of view:

(a) By an analysis of the commodity itself;

(b) By an analysis of the organization to enable it to reach its market; and

(c) By an analysis of the market.

I still believe that this is the proper approach to business research.

The facts to be collected, therefore, will assemble

themselves about the product, the marketing organization and the market.

Careful and thorough research requires that these facts be accurate, unbiased, comprehensive and at a minimum representative.

3. *Analyzing the facts*: With the problem defined and the facts assembled, the process of analysis begins. Here skill, training and, above all, sound judgment are required. In considerable part, it is a statistician's job. The construction of tables, charts and diagrams is involved. The basis of analysis will be the three divisions referred to heretofore. Since research of this kind is for aid to a traffic manager, the whole emphasis in analysis must be from a railroad transportation standpoint. The facts will not be sufficiently comprehensive or they will not have been analyzed with sufficient care and judgment unless they lay the foundation for determining just where and just how transportation fits into the picture. It is, of course, an essential part of the distributive organization. It is affected, maybe in essential aspects, by the character of the commodity, by the type or types of intermediaries or middlemen, including wholesalers and brokers, warehouse, elevator or storage men, financiers and retailers, by distributive cost or by the character of the market demand.

Analysis should be fully guarded against any bias in the data. It calls for a background of information with respect to industry, agriculture, finance, and for a sound, workable knowledge of economic principles.

4. *Interpretation of facts*: The final step in research is an interpretation of the facts. Behind the figures lies the economic story. They are the dots and dashes in the code. To have meaning they must be translated. This translation, which is interpretation, is the real test of the practical value of research. It is also the critical test of the ability of the research worker. Much research work, and therefore much money, has been wasted for lack of a proper interpretation of available facts.

This interpretation usually takes the form of a written report. Need it be said that it is something of an art in itself to draft an effective report? There are always the subtle, powerful and pervasive influences of preconceived opinion, of bending the data to support a desired finding, of omitting worrisome facts, of subordinating accuracy to a fine phrase, of desiring to reach a conclusion that will please a superior.

Interpretation requires objective treatment. That is, the mind must be divorced from "emotional thinking," from personalities, personal relations and personal feelings. The first test of objective treatment is a recognition that there are usually two sides to a question, that honest men may differ in judgment. The second test is the courage, intellectual and moral, to follow logic to its inevitable conclusion. Intrepretation calls also for judgment, sound, well balanced and practical. There is needed the power of analysis, the foundation of which is native but which may be increased and developed by training and experience.

The drafting of an interpretative report presumes an ability to write, not in a newspaper reporter's English but in a compact, square-toed, clear manner as technical as the subject requires but definite and pointed. The pre-requisite of such writing is a clear mind.

From all of this it follows that the character of research and its effectiveness will depend directly upon the character and effectiveness of the research worker. There ar good men unfitted for such work. The men fitted for it, by temperament, mental equipment and personality, are good men too.

For more than a decade I have felt that there was an increasing need for some practical sort of economic research in relation to transportation. If begun, it should be begun modestly and developed as it proves itself worthwhile. Too much should not be expected from it immediately, but it should be supported loyally through a period, say, of five years. If it could not within that period so fully justify itself as to be deemed indispensable, it should be abandoned.

If undertaken, economic research should be undertaken aright. It should be confined to research. Its personnel should not be engaged primarily to present testimony in rate or other cases. Its central purpose should be for railroad management. Its work should be of a constructive and progressive character. It should be supported wholeheartedly by all departments, with genuine co-operation. The results of such research should receive open minded consideration by proper authorities. Unless such a policy is adopted, it would probably be better not to enter the field.

Advantages To Be Derived

I believe that there are valuable results to be gained from research of this kind. Industry in other fields has obtained such results. Corresponding problems face the management of rail carriers. If I were asked what advantages might be derived from such work and to what departments, I would answer:

1. To the traffic manager most of all. He might learn, for example, why he is getting no traffic from the new auto-trailer industry, how he might recover some live stock, fruit, vegetable, coal, automobile traffic. I would say flatly that if he did not learn a great many new things about his own business, then research would not be effectively done and should be abandoned.

I can foresee information developing from such research that would be of inestimable value to traffic solicitors, and even lay the foundation for a training course for them which would revolutionize traffic-solicitation methods.

I can foresee timely reports issuing to traffic officers that would aid them in a thousand different ways, provided they read and studied them.

I can foresee that trends of traffic movements, changes in business methods could much better be anticipated than now or heretofore. There appear to be far-reaching changes impending, as indicated by such developments as the Tennessee Valley Authority, the improvements of new inland waterways, the building of highways paralleling railroads and the proposals made by regional committees to the National Resources Committee. Every one of these influences will affect transportation by rail. They are within the purview of economic research.

2. To operating officers also. Traffic moves on the basis of rates and *service*. The operating official's middle name is service. Economic research of the kind visualized here would lay before him service problems that would test his ability and ingenuity to the utmost.

3. To the chief executive, who would, of course, share in every advantage gained by his officials.

I can foresee a potential value that might be beyond price, in the field of public relations for which the chief executive is finally and solely responsible.

I can foresee reports emanating from such a research department, brief, timely, pointed, and destined to the President's desk, so instructive and so full of interest as to become a fixed practice.

Work Should Begin Modestly

My suggestion has been that, if economic research be undertaken, it should begin modestly. I am of the opinion that one man established in an office connecting with

the traffic department of a railroad, one man of the proper caliber, training and experience, just turned loose would develop some surprising angles. I believe that he would fairly quickly justify himself, even many times over, if he had no previous railroad experience, if he could work with reasonable freedom, if he were given genuine co-operation and if he were listened to open-mindedly when ready to report.

This is merely evidence of the firmness of my conviction. I do not recommend such action. Rather I would suggest the careful selection of a research man from within the ranks of the railroad if available; that he be given the necessary stenographic aid and, when required, the services of the accounting and statistical forces. Appoint an advisory committee of traffic, operating and accounting officials to sit down with such a man and outline the work, select and define the problems and sympathetically co-operate in the research process. Above all, let such a committee consider the report and its conclusions when made.

There is no criticism intended in what has been said against traffic officials or anyone else. The purpose is rather to examine dispassionately the idea of economic research in order to find its potential, practical value. Railway officials are busy men, immersed in daily transactions and facing a barrage of daily problems. Their noses are to the grindstone of every-day duties. They are men of unusual capacity or they would not be where they are. Their responsibilities are heavy and increasing. On the other hand, their very occupation with daily administrative details is a further reason why a detached objective study would be helpful.

Nor would I have it understood that nothing in the nature of economic research has been or is being done. For example, in these years of depression certain railroads have experimented with excursions. Some of these studies have been carried on with almost laboratory precision and have resulted in a beautiful, clear-cut piece of research. There were involved the methods of appeal to the traveling public, distance, service, rates, frequency. Such carriers now have a definite basis for evaluating this method of securing passenger traffic. It was a job well done.

This suggests possible broadening of the scope of research to make it co-operative. I believe it would be a helpful thing if these individual excursion studies could be brought together, carefully analyzed and formulated into a more general report. The result might well be a practical text-book for every passenger official in the country. Facilities already exist for doing this.

Then, too, there are common problems for regions, industries, even localities. Thus, the grain elevator business finds itself in the throes of change, especially the country or line elevators. The railroads have a vital interest in this problem. A correct solution must be found and railroads will be affected for better or for worse in the process. It goes beyond the province of an individual carrier to study such a problem, which is suitable for co-operative work.

There are likewise problems of national scope. These have been recognized. Many of them are being studied. It must be admitted, however, that data for such studies must perforce obscure local situations. They are frequently so broad, so vague, so general, so filled with averages and assumptions as to be out of line with the more nearly exact local figures. In any case, careful individual studies would afford a sounder basis than can now be had for the broad general, national review.

All along the line, economic research by the individual carrier would prove helpful. I would like to see it encouraged and promoted and given a fair trial.

Rapid Progress Being Made in Federal Grade Crossing Program

(*Continued from page 373*)

eliminated through grade separation or highway relocation, or dangerous conditions at already separated crossings removed through the improvement or rebuilding of existing structures. What the average cost of the work per crossing will be can only be estimated at the present time since the Bureau's figures to date deal largely with projects, which may, and frequently do, include several individual crossings, and do not, in the matter of costs, differentiate between separation, relocation and reconstruction projects.

The records show that the approved programs in the different states include several projects estimated to cost in excess of $1,000,000, a number which will cost more than $500,000, and many estimated to cost up to $100,000. The bulk of the projects, however, are estimated to cost from $30,000 to $50,000 each, representing largely individual crossings in rural areas. In Nebraska, where there are relatively few urban projects, the average cost of the 81 separation, relocation and reconstruction projects completed, under construction or approved, is approximately $41,600, whereas, in New York state, where many of the projects are within cities, the 62 separation, relocation or reconstruction projects under way as of August 31, are estimated to cost an average of approximately $158,775. In all probability, the 62 projects under construction in New York will affect at least 75 or 80 crossings, which, if correct, will bring the average cost per crossing down to $125,000 to $130,000. The Bureau's latest estimate for the country as a whole is that the average cost per project, in which one or more crossings will be affected, will be from $85,000 to $90,000.

Grade crossing protection through the installation of automatically-operated warning devices has, under the $200,000,000 appropriation, lagged in practically all of the states except Minnesota, a total of only 45 such installations having been put under construction, and 31 of these being in Minnesota. However, that grade crossing protection will assume a large part of the completed program is seen in the fact that in addition to the installations already completed or under way, automatic warning protection has been approved for 581 additional grade crossings, and it is expected that a considerable part of the funds yet to be assigned will be used for crossing protection, bringing the total number of automatic warning installations at crossings, by the end of the program, to possibly in excess of 1,000. The largest crossing protection programs approved thus far are those of Indiana, with 161 crossings, and Texas, with 150 crossings.

In the crossing protection projects approved thus far, the fixed-lamp flashing-light signal, with or without a rotating stop disc, is the predominating type of warning signal provided, although the flashing-light wig-wag signal has been specified for use at a considerable number of crossings and gates and the barrier-type of crossing protection have been specified in other instances. As regards signal protection at crossings, the Bureau has not been concerned with control and operating mechanisms as such, but has sought to secure uniformity in the warning aspect, that is, of alternate flashing lights in a horizontal plane. To this end, it has withheld approval of types of warning lights which do not meet this requirement.

Considering the federal grade crossing program as a whole, there is quite general satisfaction within the

Bureau of Public Roads, the state highway departments, and on the railways, with the way in which it is being administered and the progress which is being made. With no important changes, the original rules and regulations issued to govern the work, except as revised fundamentally on August 29, 1935, with regard to labor and the division of costs between labor and materials, have remained in full effect. The original rules and regulations, issued on July 12, 1935, were reported on in detail in the *Railway Age* of July 20, and the important revisions announced on August 29, were reported in the *Railway Age* of September 14.

As a result of the revisions made effective August 29, the rules and regulations became entirely workable and reflected a sincere desire upon the part of the government to see large-scale effective work done to eliminate or to minimize the hazards to life at railway-highway grade crossings. Throughout the carrying out of the program, relief for the unemployed has remained a paramount consideration, but the way has remained open to permit carrying out a wide range of worthwhile projects. Wide latitude has been afforded the states and the railways in the selection of projects, in the specific plans for improvements and the types of construction to be employed, and, where protection is involved, in the type and arrangement of signal protection to be afforded. These factors are largely responsible for the progress which has already been made under the federal grade crossing program, and for the optimistic outlook that by early spring, 1937, all of the federal funds will have been definitely assigned, and the last of the projects advanced to the actual construction stage.

Odds and Ends . . .

N. & W. Conductor-Detective

Norfolk & Western passenger conductors are no Pinkerton detectives, but one of them recently solved a "mystery" that would do credit to an ace sleuth. It was on the Fourth of July; passenger trains were packed with holiday travelers. Making his ticket-collecting rounds, a Norfolk & Western conductor saw a five dollar bill lying on the floor beneath an empty seat. Who, among all this July Fourth crowd, was out five bucks? It was a man-sized job to find the loser, but it didn't stump the railroader. He went to work. Walking up and down the long train, he stopped at this seat and that seat, questioning dozens of passengers carefully and skillfully. It looked like a futile task, when finally, the conductor found his man. The gentleman didn't even know that he had lost the bill. But he was five dollars short and he had been sitting in the seat where the money was found. He got the five.

Letters

The Southern Pacific contributes the following gems to our collection of illiterate letters received in railway offices:

"Referring to MrTurners Divis Engineer regard, if cow killer at lander if was brown bull, or blackcow. Icant not elegance that, because I didnt see cow, the only piece I find was head, was black when i so. Also he want detail statement about our fence. Our fence is not very Good condition on this sectoin, I repairs, more I cant, but to have fence put in good coniton this section, would need -10 mens for -6-six monht. Bust, they need cut, new post need, from one hand to other. This fence they need been repairs for, the last 15 years. Bust everywhere. But reguards eleges of MrClaimant he liar. I fix that fenne on that vacinity 6 mohnt ago, and fence is in good condition at lander for keeper cow out. But MrClaimant they have one, Black bull they jomp R of W fence like a staghart. I fix many places where that dam bull, broken fence dom."

Here's another:

"I receit yours kindly information and a Rule book #10213 the Surly Ill to pay $1.00 to the SPRRCo when I loose its book. I am thank very much to you for the acknowledge and kindly took me to the 118½ Section foreman who established this time, I will to swear that selfsacrificing and to strive with a liability for SPRRCo on my duty. I shall do as you order put up next Sec board and stand new board when I receit its new board."

All Aboard Is Kissing Signal

Kissing is raising ructions with train schedules, a Boston & Maine railroad conductor said. His train, loaded with fond fathers who had spent the week-end with their families at North Shore resorts, rolled into North station 10 min. behind schedule last Sunday night.

"How come?" a train dispatcher asked.

"Delayed by kissing," the old-timer replied laconically.

Then he explained: "Let me tell you what happens at the way stations when these Sunday night beach specials pull in.

"We're on time at the first couple of stops. Then we get to a station where 60 to 100 passengers are waiting. More'n half of them are fond daddies leaving the family for another week.

"The train stops. Then, almost as if they were drilled, 75 per cent of the passengers turn around and start kissing. And, when daddy is leaving mother and three or four youngsters, figure out for yourself how long it is before he actually boards the train.

"Then multiply that by the number of stops—and how can we get home on time?"—Philadelphia Inquirer.

* * *

DON'T LEAVE ME
TAKE ME BY RAIL
YOU CAN OBTAIN A SPECIAL "DOG TICKET" AT SINGLE RATE FOR THE RETURN JOURNEY AVAILABLE FOR THE SAME PERIOD AS YOUR OWN RETURN TICKET
G.W.R LMS L·N·E·R S.R

A British Railways' Poster That Few Dog Owners Would Fail to Read

Communications . . .

Old Cars as Traveling Billboards

CHICAGO

TO THE EDITOR:

Recently I observed on the New York Central a manifest train, the consist of which included in one cut a series of perishable merchandise cars bearing private ownership advertising, such as hams and lard, cleansers, dairy products, cereals, and others. In the consist also there was a cut of Pacific Fruit Express cars.

The private ownership cars bore a variety of advertising; none of the railroad owned cars bore any advertising. Why not? The standard insignia of many railroads are painted on the side of cars and I observe the Rocky Mountain goat of the Great Northern has been reinspirited by the repainting of his likeness in a more alert and rugged pose. Of course the goat alertly poised amid the high elevations of the Rocky Mountains is a fitting symbol of the scenic treats awaiting the passenger who travels via the Great Northern. It is an appropriate symbol for a great railroad that traverses a great and mountainous section of the United States.

But why not undertake a method of more comprehensive advertising by utilizing closed car equipment? If the private car companies do so and profit from it, why not the railroads? Stated otherwise: The railroad carries freight for an authorized tariff rate and incidentally carries advertising "free" for the shipper. Of course, there should be no charge for the transporting of such "free" private advertising, for an increase of business for the shipper quite possibly means an increase of transport business for the railroad.

With reference to railroad advertising generally: I have been informed that individuals now come to the ticket windows unaware that the passenger rate east of the Mississippi river has been reduced to two cents per mile in coaches and three in Pullmans. They are surprised when change is given them in excess of what they had expected; and reflect a pleasure in the discovery. This seems startlingly curious but, as fact is sometimes stranger than fiction, I believe what has been related to me.

A New York Central employee has suggested that possibly a good method of readily and cheaply advertising passenger rates and service by the railroads would be the improvisation of old box cars (such as still have good steel underframes and running gear), as "carriers" of advertising from one end of the system to the other. For instance: Although the car might have many holes in the floor or inner sheathing or leaky roof; if the sides of the car were fairly well surfaced, they could be painted brilliant white, ornamented with blue or other colorful trimmings, lettered black, etc. As I write this I notice on a distant merchandise track a Merchants Despatch Transportation car painted white, with a red trimming line directly above the steel sill and running entire length of car. There is nothing about these colorings on the side of a car that would interfere in any manner with the operation of the train. There would not be any hazard of confusion either by night or by day with the signals on engine or caboose.

It is suggested that the lettering on these improvised advertising cars show the new lower rates of passenger fares, with some fitting and alert suggestions, to the multitude of observers along the line to patronize the railroad. The car could be placed ahead of the caboose and could be carried through to final destination of the train, there to be promptly switched into reverse movement and paraded back to the initial point.

The attention of motorists and bus passengers traveling on parallel paved highways would be attracted; the small town folks and the farmer would comment and the psychology of the advertising in motion would draw patronage. The expense of repainting, lettering and hauling, would be little, and the beneficial results should fully justify it.

With reference to some of the poster advertising in stations, there has appeared at intervals in various stations posters bearing designs of a "modernistic" character; distortions of physical outline as we sometimes observe in the department store windows along the street. There was an instance when a baggage agent, with whom I was acquainted, took me by the arm and leading me to some posters on the station wall said: "Now, will you tell me what that means?" He was an intelligent baggage agent. I suggested that the designer possibly intended to convey to the public that to travel by certain of our Western railroads rugged mountain scenery would be encountered. Although I am personally quite familiar with those mountains the thought occurred to me, however, that the "modernistic" designs looked about as much like the Rockies, the Sierra, the Cascades or the Selkirks as a box car looks like an oil tank.

The simple fact is: A mountain range should look like a mountain range. Why commit an abortion of its outlines when mere man attempts to reproduce it? Will the designer answer that? Some of the world's most captivating scenery may be seen in our Western states and its reproduction on advertising lithographs should be as true to detail as it may be possible to make it. Mountains were built in the Providential scheme of things—why should their outlines be distorted by man?

EDWIN SWERGAL

The I.C.C. Can Stop This When They Get Around to It

NEW YORK

TO THE EDITOR:

While on a trip to the northeastern part of Pennsylvania recently, I had occasion to stop at a town in the vicinity of which are a number of large slate quarries. I had a gentleman traveling with me who had never inspected a slate quarry, so one of our local friends volunteered to show us how slate is quarried and prepared for the market. While we were doing this a powerful and heavy motor truck with a large trailer drove up to the plant. In talking to the driver, we learned that he came from Washington, D. C., and would return there with a heavy load of slate just as soon as arrangements could be made for loading the truck that evening.

We further learned from this man that he had lost his way on the road and had landed in New York City, then had driven over to the Pennsylvania town. This detour probably added nearly 150 extra miles on the trip from Washington (a considerable extra item of expense in operating a heavy truck and trailer).

Further interrogation of this driver brought out a statement that he had been driving almost constantly, night and day, for a week. Upon asking him how much sleep he had been able to get, he answered with the astonishing remark that it had totaled about three hours. While it seems inconceivable that a man could continue to function at all with so little time for sleep, and in all probability he was exaggerating his lack of rest, it is clearly indicated that the truck and driver would constitute about the worst menace on the highways that night. He was advised to go into a shack and take a little more sleep while his truck was being loaded, but it is not believed that he heeded this advice. We told him that we would rather ride with a load of dynamite than to be with him on the return trip to Washington that night. This information is being given to you in a general way with the thought that is should prove to be of value to railroad freight traffic officers in their solicitation activities.

We were advised that a large percentage of the slate from the quarries is now being shipped by motor trucks and that many of the loads are being hauled long distances. The railroads should have more of this business and I am sure that everyone who must use the highways frequently for business and pleasure riding feel that they should not be exposed to the hazards incident to meeting trucks that are operated by drivers who cannot be in proper condition to handle their trucks safely under circumstances as mentioned above. Those who are responsible for routing freight shipments via the highways, where the railroads are offering better service, should realize that they are exposing themselves and their families to these dangers by their individual actions and contributions to these hazards.

This situation is probably typical of several thousand similar conditions occurring daily throughout the country and exposing to the hazards as indicated all who are obliged to use the highways.

E. R. MASON

NEWS

New Facilities Increase Use of Power on Trains

Demands of improved lighting, air conditioning and other improvements being studied

Installation of improved lighting facilities, air conditioning, and many other improvements, practically all of which are designed to add comfort to the traveling public, has resulted in a greater demand for electricity on trains today than ever before, according to a statement by the Association of American Railroads. How to increase the amount of electric power available for such purposes and adequately meet a demand that is constantly growing is a problem that is being seriously studied.

Because the public is becoming more and more accustomed to a higher intensity of illumination in homes and places of business, the railroads are being called upon to provide illumination of comparable intensity in passenger cars. The trend to artistic effects in illumination also requires an increased amount of power.

Some idea as to the amount of electrical power required for a passenger car is indicated by the fact that a standard Pullman car moving in a train generates for its own use enough electrical power to light approximately four ordinary homes. These cars have from 80 to more than 100 electric lights. In addition, there are electric fans and other electrical appliances. Facilities are even provided so that the ladies may make use of an electric curling iron. In the club cars, toasters, coffee kettles, drink mixers and various other appliances are operated by electricity. A few railroads use electricity for cooking.

Present-day passenger trains constitute mobile generating plants. Each Pullman or other passenger car must produce its own electricity. This is done by means of belts that connect generators with the axles of the car wheels. As electric power can only be produced by this means when the train is in motion, storage batteries under each car are available for emergency purposes or to keep the lights bright when the car is standing still. These storage batteries are capable of supplying electricity for from six to eight hours on the average car.

To meet the increasing demands for electricity, the output of axle generators on passenger cars has in recent years been greatly increased. In some cases the output has been doubled while in other cases it is three and four times greater than a few years ago. At the same time, the capacities of the storage batteries have also been doubled and in some cases trebled.

The greater volume of electrical power required on the newer trains for improved lighting and air conditioning equipment is being obtained in different ways. Where a car must at times act as an individual unit and supply its own electric current, the largest axle generator equipments and batteries so far found suitable for such purposes are being used. Where the train remains intact throughout its run, a steam turbine or Diesel engine driven power plant is being used at the head end of the train, the current being transmitted to each car by means of heavy wires running the length of the train. Alternating current is usually used with a transformer on each car in order to furnish the current at the proper voltage. Where batteries may be required on each car, means are being provided for changing the alternating current to direct current suitable for charging these batteries.

Milwaukee Veterans to Meet September 10

About 3,000 members of the Chicago, Milwaukee, St. Paul & Pacific Veteran Employees' Association will hold their annual reunion at the Hotel Sherman, Chicago, on September 10 and 11. The organization has a membership of 7,000, including both active and retired employees, representing about one-fifth of the total number in the service. Among the members is John M. Horan, for whom is claimed the distinction of holding the world's record for longest continuous service with one company. At the age of 98 he has been in the employ of the Milwaukee 81 years and refuses to retire.

Eastern Association of Car Service Officers

The Eastern Association of Car Service Officers will hold its regular fall meeting at Hotel Astor, New York City, on Friday, October 2. J. T. Bougher, secretary, 424 West 33rd street, New York, issuing the call for this meeting, quotes a letter from J. M. Symes, vice-president of the Association of American Railroads, telling of the action of the Transportation division, A. A. R., at Chicago, on May 22, recording its approval of the activities of the regional associations of car accounting officers, and recommending attendance at their meetings.

Railways Had Best Labor Day Business Since 1929

Report passenger traffic gains of up to 100 per cent over last year

Railroads generally handled last week-end the heaviest Labor Day passenger business that they have enjoyed since 1929. The increases over last year ranged in the East up to 100 per cent and, while complete figures have not yet been compiled, passenger traffic officers there were employing such terms as "tremendous" and "bang-up" to describe the week-end's volume of travel. The composite increase on Western roads was estimated at 35 per cent.

During the week-end the New York Central operated 152 extra trains in and out of New York and in addition carried extra cars on all regular trains. For the first week in September this road's business at Grand Central Terminal, New York, was up 50 per cent as compared with last year, while the business of all its city passenger stations was up 43.2 per cent.

The Pennsylvania operated out of New York 150 extra trains comprised of 1500 cars. Its Labor Day business was heavier than that of any year since 1929, with Washington, D. C., and Atlantic City, N. J., trains leaving New York in four and five sections, and Western trains in three and four sections. Extra trains were also operated by the Long Island, which is usually able to accommodate holiday crowds in extra cars on regular trains.

The Baltimore & Ohio reported an increase of between 45 and 55 per cent as compared with last year in passengers using its Labor Day week-end trains into and out of New York. This road put on extra trains as well as extra coaches and Pullmans on all regular trains. The Central of New Jersey, experiencing a 28 per cent increase in volume as compared with last year, also found business on its Sandy Hook steamers much better than in 1935. For August this road had an increase of 20 per cent in local passenger revenue as compared with August, 1935.

Labor Day travel on the Delaware, Lackawanna & Western was double that of a year ago, and the heaviest since 1929. Extra sections were operated on all trains, with the Lackawanna Limited having four sections on Labor Day. The Lehigh Valley, reporting the best business

since 1929, anticipates that complete returns may yet make last week-end its all-time Labor Day record.

The New York, New Haven & Hartford has not yet compiled figures on its volume of business but reports a "tremendous" increase over last year. The carrying out of its plans for the use of 825 extra cars and for four and five sections of its Boston-New York trains were fully required by the demands of travelers.

In the West one railroad reported that the business this year was the largest holiday business ever experienced, necessitating the employment of every available passenger car, including suburban cars, to carry inter-city passengers. One of the heaviest movements was that between Chicago and the Twin Cities. The Hiawatha, of the Chicago, Milwaukee, St. Paul & Pacific, on Friday, Saturday and Sunday, was operated in and out of Chicago each day in three sections. The two Twin City sections carried eight cars each, while the section for the North Woods of Wisconsin carried seven cars. The "400" and the Flambeau, of the Chicago & North Western, operating to the Twin Cities and to Ironwood, respectively, each carried 700 passengers in two sections on Friday. On Friday and Saturday, both the northbound and southbound Zephyrs were operated in two sections, steam trains being used as second sections.

Club Meeting

The Southern & Southwestern Railway Club will hold its next meeting at Ansley Hotel, Atlanta, Ga., on Thursday, September 17, at 10 a.m. E. H. Gumbart, Jr., of the Bethlehem Steel Company, will present a paper on alloy steels, illustrated by new motion pictures.

Philadelphia Traffic Club Has New Headquarters

The Philadelphia Traffic Club has established permanent headquarters at the Warwick Hotel, a suite of seven rooms having been remodeled for the purpose. The occasion was celebrated by the members at an "open house" held on September 1.

Retirement Board Certifies Additional Pension Claims

The Railroad Retirement Board has certified to the Treasury department the names of 97 additional retired railroad employees, whose applications have been checked by the board, as eligible for the payment of retirement annuities under the railroad retirement act. The board has now set up an organization to handle 80 to 100 certifications a day.

London's Lord Mayor Opens New C. N. R. Station

The Lord Mayor of London, England (the Right Hon. Sir Percy Vincent), officiated at the opening of the new Canadian National station in London, Ont., last week. The function was carried out in full Old World tradition, with the Lord Mayor bedecked in his ceremonial garments and attended by other functionaries of the City of London in similarly resplendent raiment. The Lord Mayor and his entourage were greeted by W. A. Kingsland, vice-president of the Central region, and railway and World War veterans as a guard of honor, after which the Lord Mayor formally opened the new station.

Successful Localized Publicity in Northern Michigan

The Michigan Railroad Employees & Citizens League has for some time been "localizing" its publicity program, i.e., stressing the importance of railroad taxes and payrolls in each county in the state. For this purpose an individual leaflet has been prepared for each county entitled "What the Railroad Means to This County." The leaflet gives the names of the railroads in the county, the railway mileage, number of employees, payrolls and taxes *contrasted with what these totals formerly were*. It stresses the importance to all residents of the county of restoring these totals, and how giving them competitive equality would help.

To intensify this localized message the local units in the Upper Peninsula recently had an exhibition booth at the Upper Peninsula Fair at Escanaba. In charge were wives and daughters of employees, and the booth was a popular stopping place for visitors to the fair. Tastefully decorated, the booth was brightened up with Pullman and Express Agency posters, while in front of the booth an order board was set up.

In all 14,000 pieces of League literature were given out, in addition to many calendars and folders of individual railroads. The effort was believed to have been a thoroughgoing success not only in "putting the railroads on the map" in the Upper Peninsula, but actually putting them into the homes and the consciousness of the citizens of that section.

Filing of Contracts by Contract Carriers Postponed

The Interstate Commerce Commission has received petitions seeking a modification of its order of July 11, requiring contract carriers by motor vehicle to file, on or before October 1, copies of their contracts in lieu of schedules of minimum charges. It appears, the commission said in a notice issued September 5, that many carriers are claiming to be contract carriers and as such have filed schedules of minimum charges notwithstanding that they undertake and hold themselves out to transport property for the general public and are in reality common carriers required by the act to file tariffs. It was this situation that the commission sought to correct by its order of July 11. It also appears from the petitions that it may not be necessary, in order to correct the situation outlined above, to have the order

apply to certain classes or groups of carriers. In order to avoid placing any unnecessary restrictions or burdens upon legitimate contract carriers the commission has extended the effective date of its order to December 1, 1936, and in the meantime will give consideration to establishing just and reasonable classifications of groups of common and contract carriers as provided in section 204(c) to the end that it may consider the various groups and determine to which the requirements of its order should apply.

Hiawatha Business Still on the Increase

The Hiawatha, streamlined train of the Chicago, Milwaukee, St. Paul & Pacific, continued to establish records for patronage during August, carrying a total of 34,119 revenue passengers, an average of 1,101 each day. These figures include paying passengers on the sections operated between Chicago, Milwaukee and the Twin Cities and those traveling on the North Woods section, in service this summer, between Chicago and Milwaukee and the resort regions of northern Wisconsin. Since the Hiawatha commenced operation on May 29, 1935, a total of 323,585 paying passengers patronized the train up to the end of August this year, an average of 701 daily. August business this year is 36 per cent ahead of a year ago, when 25,003 revenue passengers traveled on the train.

Heavy Traffic of Air Lines

Air lines in the United States carried 110,690 passengers in July, the Bureau of Air Commerce, Department of Commerce, has announced. This total was a new record for passengers carried in a month, and this is the first time the total for the domestic lines has passed 100,000 in a month. The new record follows upon record-breaking totals in May and June.

The bureau's monthly report, covering operations of 21 of the 22 scheduled air lines, shows that these lines also carried 613,837 lb. of express. They flew 6,024,518 miles and recorded 44,308,455 passenger-miles.

Passenger-seat-miles flown were 63,555,158, and approximately 70 per cent of the available seats were occupied.

Complete figures with comparisons follow:

	June 1936	July 1936	July 1935
Companies operating	21	22	23
Companies reporting	21	21	23
Passengers carried	97,453	110,690	85,546
Passenger miles flown	40,252,357	44,308,455	34,042,284
Express carried (pounds)	701,142	613,837	335,672
Express pound miles	344,433,493	299,509,562	178,691,741
Miles flown	5,619,896	6,024,518	5,604,519
Passenger seat miles flown	59,904,819	63,555,158	59,479,271
Per cent of seats used	68.11	69.72	57.23

I. C. Suburban Fares Cut

The Illinois Central, on September 18, will place reduced suburban fares in effect in Chicago and vicinity and, at the same time, will establish a 12-ride weekly commutation ticket and extend the privileges of "shoppers" or daily round-trip tickets. Under the new arrangement a round-trip ticket which will be on sale daily and good until midnight following the date of sale and at a lower rate, will replace the present two-trip tickets. A 10-ride ticket will replace the present 25-ride ticket, while the present 60-ride, or monthly, ticket will be discontinued on the South Chicago branch and on the main line from Kensington north. They will be replaced by the new and lower priced 12-ride weekly individual tickets sold daily and good for use from the sale date to the following Sunday at midnight.

For the present shoppers' tickets or round-trips good for one day and then only between 9:30 a.m. and 4 p.m., there will be substituted the new conditional round-trip tickets on sale daily and good for transportation from 9:30 a.m. of one day to 3 a.m. of the following day, with the exception that they may not be used southbound (from the city) during the 4:30 to 6:30 p.m. rush hours of business days. One purpose in extending the hours of these tickets is to encourage the use of the all-night train service which this railroad provides. Comparisons of the new fares with the old, and the graduation according to distance are shown at a few stations.

Fares in Cents Per Ride Between "Downtown" and

	63rd Street 7.7 mi.	South Shore 9.9 mi.	82nd Street 10.1 mi.	Blue Island 18.7 mi.	Flossmoor 24.7 mi.
Present One-Way	$.15	$.17	$.17	$.33	$.44
New One-Way	.10	.12	.13	.27	.31
Present Round-Trip	.135	.155	.155	.30	.40
New Round-Trip	.09	.11	.12	.235	.28
Present Shoppers' Round-Trip	.10	.11	.125	.15	.20
New Conditional Round-Trip	.085	.105	.115	.15	.20
Present 10-Ride	.132	.132	.132	.238	.317
Present 25-Ride	.132	.132	.132	.208	.254
New 10-Ride	.10	.12	.13	.208	.254
Present Monthly	.097	.110	.116	.119	.149
New Monthly	none	none	none	.119	.149
New 12-Ride Weekly	.083	.104	.113	.18	.233

U. P. Winter Resort at Ketchum

The Union Pacific's new winter sports center near Ketchum, Idaho, in the Sun Valley northeast of Boise in the Sawtooth mountains, is planned to attract the thousands of Americans who make pilgrimages to famous European sports centers for winter activities. The lodge, designed in western American style, will be air conditioned, and includes private sun porches in igloo style for winter sun-bathing, bachelor apartments, and game and club rooms where regular dancing parties with Eddy Duchin's band are planned. Other features to be offered will be a glass-enclosed swimming pool fed by warm spring water, and a flood-lighted ice skating rink. A skiing course is being laid along a two-mile mountain side with a cable-mounted basket to hoist the skiers back up the mountain. Daily sleeping car service will be operated to Ketchum, which is located on the Shoshone-Ketchum branch, 69 miles from the main line.

At the opening of the lodge at Christmas time it is planned to have on hand Count Felix Schaffgotsch, Austrian sportsman, as master of winter sports, and Hans Hauser, Austrian ski champion with five assistants, who will conduct a skiing school on Dollar mountain, opposite the lodge.

Western Carriers Establish Interline Drouth Rates

Following the request of Governor Landon, on August 31, asking that railroads in Kansas establish interline drouth rates, those serving Illinois, Iowa, Kansas, Montana, Nebraska, Oklahoma and North and South Dakota, at a meeting in Chicago on September 4, decided to place in effect interline rates supplementing those already established by individual lines. The governor's request for such rates had been made twice before and had been refused. On August 31 he wired the traffic officers of the Atchison, Topeka & Santa Fe; the Chicago, Rock Island & Pacific; the Chicago, Burlington & Quincy; the Texas & Pacific; the St. Louis-San Francisco; the Missouri Kansas Texas; the Fort Worth & Denver City; the Union Pacific; the Missouri Pacific and the Southern Pacific saying that the drouth rates in effect in Kansas are in many cases of little or no value because they are limited to movement over one railroad. He also urged that steps be taken to include grains and concentrates and to make all drouth rates apply both to single and joint line movements.

While the railroads agreed to the establishment of interline rates, it was not without assurance that the rates would not be used on shipments to market by shippers not entitled to the rates. Under the plan set up, a drouth relief committee will pass on every shipment of cattle or feedstuffs made under the reduced rates. Members of the committee will have full charge of policing the operations to insure that no one not entitled to them shall get any benefit from the low rates. The reductions provide that farmers shipping cattle from drouth areas to more favorable localities for grazing will pay 85 per cent of the full rate to the grazing areas, but they will pay only 15 per cent of the full rate for the movement back to their farms, thus making the reduction 50 per cent. If the drouth area cattle are moved directly to the markets instead of back to the point of origin, the 85 per cent payment on the first shipment may be applied against the through rate from the original shipping point to the market.

On feedstuffs there will be a flat reduction of 33⅓ per cent on movements originating in all parts of the country. The only grains excepted from the reduction are wheat and rye. All other animal feeds are included, among them corn, hay, oats, alfalfa, cottonseed oil, soy bean products and linseed oil. The rate reductions are held to feeds largely used for animal feeding so that grains used principally for human consumption shall not be diverted to animal use.

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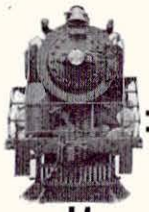
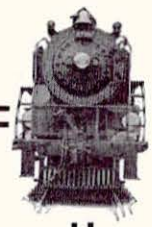
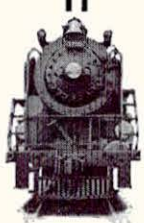


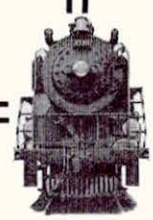


MODERN LOCOMOTIVES

are reducing the cost of transportation



Modern locomotives increase train loads and increase train speeds without increase in locomotive weights » » Look at modern power as an investment that, after all proper charges including amortization have been made, will yield a handsome profit because it moves trains faster and at less cost.



LIMA LOCOMOTIVE WORKS
INCORPORATED, LIMA, OHIO

LIMA
LOCOMOTIVE WORKS
INCORPORATED

Supply Trade

Frederick O. Schramm has been appointed district sales agent for New York and vicinity of the **Pittsburgh Steel Foundry Corporation,** Glassport, Pa. Mr. Schramm's headquarters are at 11 West 42nd street, New York City.

Howard E. Eagleston, Pacific district manager of the **General Cable Corporation,** White Plains, N. Y., has been appointed general sales manager with headquarters at 420 Lexington avenue, New York City.

Frank J. Laskey, assistant general purchasing agent of the **Republic Steel Corporation,** Cleveland, Ohio, has been appointed general purchasing agent and **Robert E. Sherratt** has been appointed assistant general purchasing agent.

The New York office of **The Timken Steel & Tube Company, Arthur R. Adelberg,** district manager, will be located at 165 Broadway after September 15. Mr. Adelberg formerly had his office in The Timken Roller Bearing Company offices at 16 West 60th street.

James S. Hearons has been appointed assistant manager of sales, Railroad division of the **Inland Steel Company,** Chicago. Mr. Hearons attended school in the East, and began work as a special apprentice on the Erie in 1906, and later became associated with the Illinois Central. During the World War he served in the A. E. F. as captain in the Engineering division. Prior to his Inland appointment, Mr. Hearons was assistant to the president of the Clark Equipment Company, specializing on railroad sales.

George I. Wright has been appointed manager transportation department of the **Westinghouse Electric & Manufacturing Company,** with headquarters at East Pittsburgh, Pa. He has charge of engineering and sales of equipment supplied to the transportation industry. **A. C. Streamer,** formerly transportation manager, has been appointed manager of the switchgear division of the company. Mr. Wright, until his present association with Westinghouse, was chief electrical engineer of the Reading and made his headquarters in Philadelphia. He is chairman of the electrical section of the Association of American Railroads, and chairman of the committee on transportation of the American Institute of Electrical Engineers. He is a native of East Orange, N. J. Mr. Wright was educated in California and received his degree in electrical engineering from Standford University in 1913. Prior to his association with the Reading Company, in 1927, he had been active in various capacities with the Southern Pacific, the MacDougal-Duluth Shipbuilding Company, the Duluth Edison Electric Company and was assistant electrical engineer of the Illinois Central. During the World War he served as lieutenant on the U.S.S. Montana and also was on submarine construction. He is now a lieutenant commander in the Naval Reserves. In 1927, he joined the Reading Company, where he had charge of the design and installation of the Philadelphia suburban electrical system of that railroad. In 1931 he was made chief electrical engineer of this system and later given jurisdiction over the Central of New Jersey.

George I. Wright

OBITUARY

Harry Orville Fettinger, New York railroad representative of the Ashton Valve Company, Boston, Mass., died on August 20 of a heart ailment after a long illness, at his home in Roselle, N. J., at the age of 67 years. Mr. Fettinger was born at Altoona, Pa., and began work in 1887 as machinist apprentice in the Altoona machine shops of the Pennsylvania, later serving consecutively as journeyman machinist, inspector in the office of superintendent of motive power and inspector in the office of general superintendent of motive power. From 1904 he was air brake and steam heat inspector until 1906, then chief air brake and steam heat inspector of the Pennsylvania System; later in the same year he entered the supply business. From 1906 to 1911 he was a salesman in the railroad department of the Johns-Manville Corporation, then to 1914 he was a representative of the Safety Car Heating & Lighting Company. In 1914 he entered the service of the Ashton Valve Company and for 22 years served as manager of its railroad department in New York. In addition to his membership in technical organizations Mr. Fettinger was interested in civic affairs, having served as president of the board of education of his home town.

TRADE PUBLICATION

KOPPAX BLACK PAINT.—This is a product of the Koppers Products Company, Pittsburgh, Pa., that is featured in a recently issued folder. Attention is directed to its resistance to water, heat and corrosion, its elasticity and economy for application to metal surfaces. Illustrations depict structures on which it has been applied.

Equipment and Supplies

LOCOMOTIVES

THE KANSAS CITY SOUTHERN contemplates buying ten locomotives of the 2-10-4 type.

THE ALIQUIPPA & SOUTHERN has ordered one switching locomotive of the 0-8-0 type from the American Locomotive Company. This locomotive will have 25 in. by 28 in. cylinders and a total weight in working order of 231,000 lb.

THE TOLEDO, PEORIA & WESTERN has ordered six locomotives of the 4-8-4 type from the American Locomotive Company. These locomotives will have 23½ in. by 30 in. cylinders and a total weight in working order of 365,000 lb. Inquiry for this equipment was reported in the *Railway Age* of June 6.

FREIGHT CARS

THE BOSTON & MAINE has ordered 750 new gondola cars of 50 tons' capacity from the Bethlehem Steel Company.

THE KANSAS CITY SOUTHERN is inquiring for 750 box cars of 50 tons' capacity and about 200 hopper cars of 70 tons' capacity.

MISSOURI PACIFIC LINES.—Orders have been placed for 200 box cars, 40 ft. 6 in. long and of 40 tons' capacity, with the Mt. Vernon Car Manufacturing Company. These cars are assigned to the New Orleans, Texas & Mexico. Inquiry for this equipment was reported in the *Railway Age* of August 15.

MISSOURI PACIFIC.—The federal district court at St. Louis, Mo., has authorized the trustee of the Missouri Pacific to install Evans automobile loading devices in 150 aditional box cars, and to modernize 208 cars, already equipped with such devices, by the installation of parts that will permit the loading of late model automobiles. The work will cost $180,850.

PASSENGER CARS

THE CHICAGO & EASTERN ILLINOIS is inquiring for two rail motor cars with passenger and mail compartments.

THE CHILEAN STATE RAILWAYS have ordered three rail motor cars from the Edwards Railway Motor Car Company. Each of these cars has a capacity for 34 passengers and is equipped with kitchenette and toilet facilities, two of these are to be driven by gasoline engines and one by a Diesel engine.

IRON & STEEL

THE SEABOARD AIR LINE has ordered 10,000 tons of 100-lb. rail—6,800 tons from the Tennessee Coal, Iron & Railroad Company, and 3,200 tons from the Bethlehem Steel Company.

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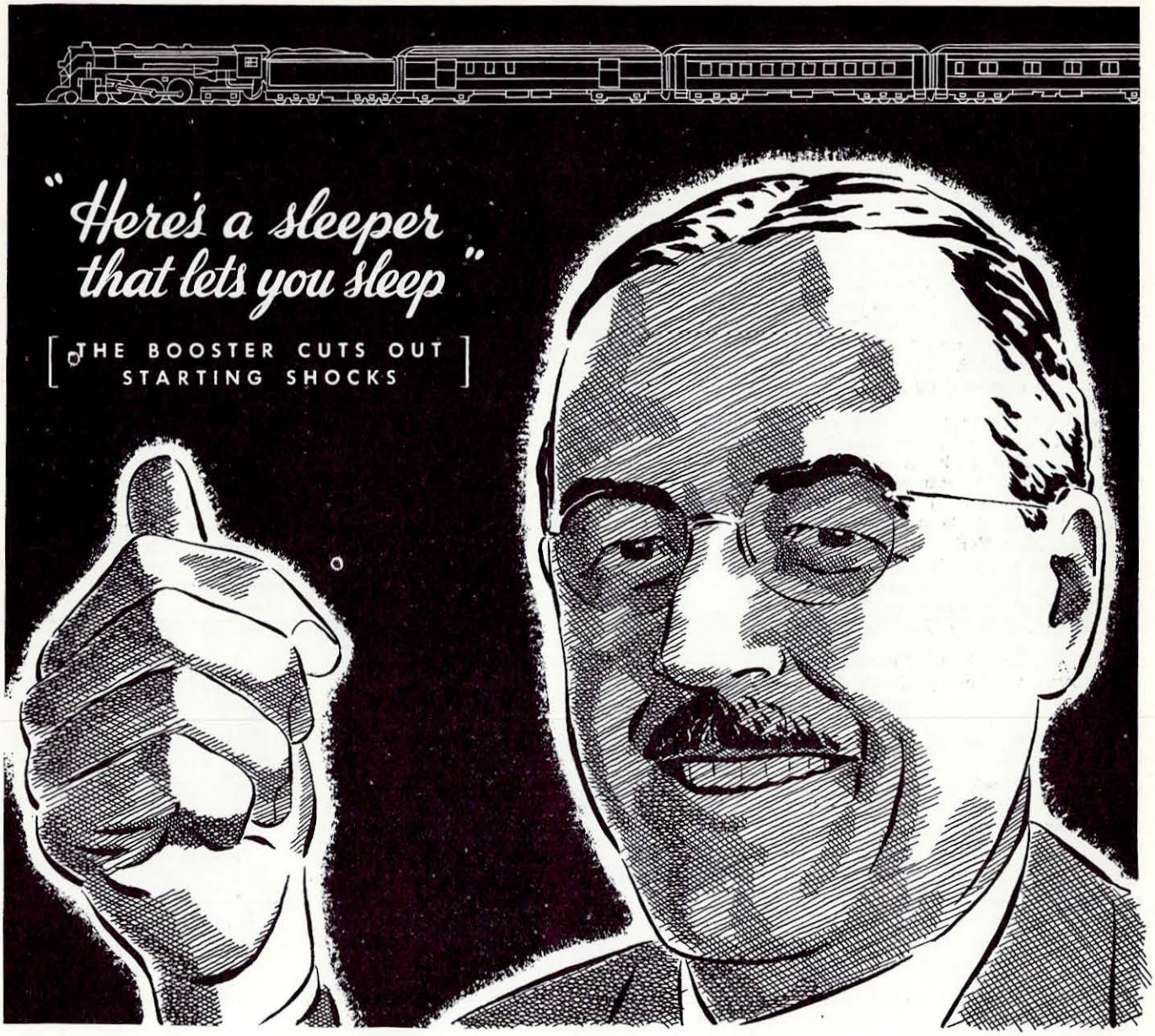
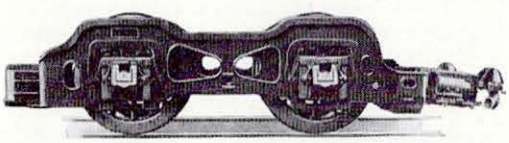


"Here's a sleeper for you.

"I don't know anything about railroading, but why can't all trains run like this one does.

"I slept clear through the night—this sleeper lets you sleep—it doesn't jar you awake every time the train starts."

All your trains can be as smoothly operated as this if the locomotives are Booster-equipped. And you'll get big dividends in the boosts the passengers will give your railroad.



FRANKLIN RAILWAY SUPPLY CO., INC. NEW YORK CHICAGO MONTREAL

Construction

BESSEMER & LAKE ERIE.—This company has authorized the replacing of the wooden portion (148 ft.) of Dock No. 1, with steel piling and reinforced concrete deck, at Conneaut, Ohio. The work is to be done by the company forces and to cost about $32,000.

NEW YORK CENTRAL.—Bids have been received for the West Side Improvements of this road between 98th street and 111th street, New York City. The Del Balso Construction Corporation, New York, submitted the lowest bid. The contract calls for the furnishing of 6,000 tons of steel.

NEW YORK CENTRAL.—A contract has been given to the Del Balso Construction Corporation, New York, for the construction of a drainage system, retaining walls, and all work incidental thereto for express highway between W. 171st street and Corbin Place, New York City. A contract has also been given to H. R. Beebe, Inc., Utica, N. Y., for work in connection with the elimination of Carey road crossing, 1.1 miles west of Whitesboro station, N. Y.

STATEN ISLAND RAPID TRANSIT RAILWAY COMPANY.—This Baltimore & Ohio subsidiary has given a contract to the Auserehl & Son Contracting Corporation, Jamaica, N. Y., for the construction of new passenger station facilities in connection with its grade crossing elimination project at Port Richmond and Tower Hill, Staten Island, N. Y., to cost about $50,000.

WABASH.—Bids were received on September 3 for the construction of a one-story brick passenger station, 23 ft. by 64 ft. in plan, and also a water station near Sixth and Edward streets, at St. Charles, Mo.

Financial

FORT WORTH & DENVER CITY.—*Redemption.*—This company has called for redemption (on October 26) at a premium of 5 per cent its first mortgage bonds (dated December 29, 1881, and extended November 30, 1921).

GREAT NORTHERN.—*Certificate for Motor Operation.*—Joint Board No. 24 has recommended in a proposed report to the Interstate Commerce Commission that it issue a certificate authorizing this company to operate as a common carrier of commodities generally by motor vehicle between Breckenridge, Minn., and Fargo, N. D., an operation begun between June 1 and October 1, 1935.

NEW YORK CENTRAL.—*Special Stockholders' Meeting.*—A special meeting of the stockholders has been called, to be held at Albany, N. Y., October 15, at which a vote will be taken on renewal of leases of the St. Lawrence & Adirondack and the Ottawa & New York, on amendments to the leases of the Hudson River Connecting R.R. and the Ohio Central Lines, with the view of simplifying the company's capital structure.

NORTHERN PACIFIC.—*Equipment Trust Certificates.*—The Interstate Commerce Commission has authorized this company to assume liability for $3,000,000 of 2¼ per cent equipment trust of 1936 certificates, maturing 1937-46, to be sold to Salomon Brothers & Hutzler at 101.259, making the annual interest cost approximately 2 per cent.

OKMULGEE NORTHERN.—*Stock.*—The Interstate Commerce Commission has authorized this company to issue $363,000 of stock—$242,000 in exchange for existing stock and the balance as a stock dividend.

Dividends Declared

St. Louis, Rocky Mt. & Pacific,—25c, quarterly; Preferred, $1.25, quarterly, both payable September 30 to holders of record September 15.

Average Prices of Stocks and of Bonds

	Sept. 8	Last week	Last year
Average price of 20 representative railway stocks..	55.76	54.66	37.63
Average price of 20 representative railway bonds..	82.45	81.48	74.42

Railway Officers

OPERATING

R. C. Kline, division engineer of the Atchison, Topeka & Santa Fe, with headquarters at Winslow, Ariz., has been appointed assistant superintendent, with headquarters at Prescott, Ariz., to succeed **Ralph Jones,** deceased.

A. S. Hunt, who has been connected with the Western Union Telegraph Company, has been appointed superintendent of telegraph of the Denver & Rio Grande Western, with headquarters at Denver, Colo., to succeed **John W. Brunton,** who retired on September 1, at the age of 70 years.

N. N. Hopkins has been appointed superintendent of the New Orleans & Lower Coast (a unit of the Missouri Pacific lines), with headquarters at Algiers, La. In announcing this appointment in the *Railway Age* of August 22, Mr. Hopkins' name was given incorrectly as M. N. Hopkins.

B. O. Wedge, assistant superintendent of the Union Pacific, with headquarters at Denver, Colo., has been promoted to superintendent of the Wyoming division, with headquarters at Cheyenne, Wyo., to succeed **T. E. Williams,** who has been appointed assistant superintendent of the Wyoming division, with headquarters at Green River, Wyo.

Wade Hampton Blake, division superintendent of the South Florida division of the Seaboard Air Line, with headquarters at Tampa, Fla., whose retirement on August 25 was noted in the *Railway Age* of August 29, was born on October 11, 1873, near Jasper, Tenn. Mr. Blake received his education in the high school and business college and entered railroad service on March 1, 1900, with the Plant system (now Atlantic Coast Line) at High Springs, Fla., as a clerk. He was appointed superintendent of the Tampa Northern on January 1, 1911, and subsequently became superintendent of the East & West Coast on May 1, 1917, and the Tampa & Gulf Coast on May 1, 1920, all three of these short lines being subsidiaries of the Seaboard Air Line. On November 1, 1925, Mr. Blake was appointed superintendent of the West Florida division of the Seaboard Air Line and became superintendent of the South Florida division on February 28, 1928, which position he held until his retirement.

J. H. Bowen, whose appointment as superintendent of the Georgia division of the Seaboard Air Line, with headquarters at Atlanta, Ga., was noted in the *Railway Age* of August 29, was born on March 2, 1893, at Abbeville, Ga. He attended high school in that city and Georgia Normal

J. H. Bowen

College. Mr. Bowen entered railway service on July 16, 1907, with the Seaboard Air Line as telegraph operator. He served as operator and agent at Abbeville, Richland, and Cordele, Ga., from July 16, 1907, to March 1, 1924, and on the latter date was appointed supervisory agent at Americus, Ga. Mr. Bowen was promoted to assistant trainmaster of the Alabama division on January 16, 1925, and became trainmaster on February 15, 1927. He was transferred to the North Carolina division on March 20, 1934. Mr. Bowen's entire railroad service has been with the Seaboard Air Line.

TRAFFIC

R. H. Campbell has been appointed general agent for the Alabama, Tennessee & Northern, with headquarters at Chicago, Ill., succeeding **John C. Riegel,** who has resigned to accept service with another company.

Elmer B. Johnson has been appointed assistant general freight agent of the

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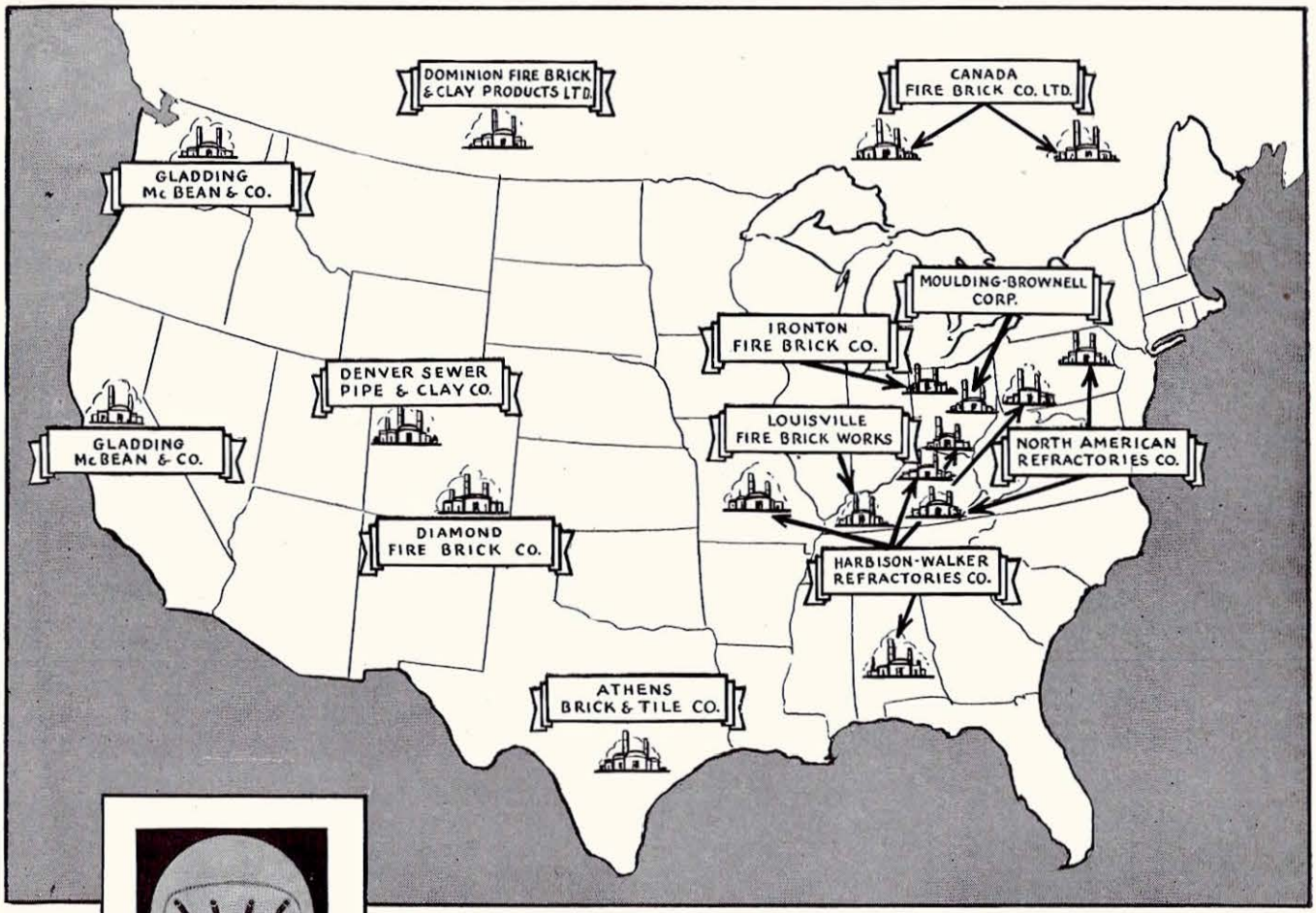
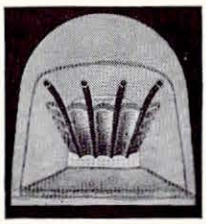
There Is A "Security Arch" Plant Near You


DOMINION FIRE BRICK & CLAY PRODUCTS LTD.
CANADA FIRE BRICK CO. LTD.
GLADDING Mc BEAN & CO.
MOULDING-BROWNELL CORP.
IRONTON FIRE BRICK CO.
DENVER SEWER PIPE & CLAY CO.
LOUISVILLE FIRE BRICK WORKS
GLADDING Mc BEAN & CO.
NORTH AMERICAN REFRACTORIES CO.
DIAMOND FIRE BRICK CO.
HARBISON-WALKER REFRACTORIES CO.
ATHENS BRICK & TILE CO.



SECURITY ARCHES

There's More to
SECURITY ARCHES
Than Just Brick

"Ready to serve" expresses in three words the standard of railroading.

This same standard was recognized years ago by the American Arch Company as essential in providing sources of supply for locomotive arch brick.

Security Arch Brick is promptly available at many points throughout the country.

This ready availability guarantees against delay.

These points of availability of Security Arch Brick are indicated above.

AMERICAN ARCH COMPANY
INCORPORATED
Locomotive Combustion Specialists
NEW YORK CHICAGO

Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Calif. **F. A. Bell** has been appointed assistant general freight agent, with headquarters at Los Angeles, Calif. **Heath W. Pate** has been appointed general agent at Portland, Ore., succeeding **L. C. Krames,** promoted.

James P. Hanlon, traveling freight and passenger agent for the St. Louis-San Francisco, with headquarters at Chicago, has been promoted to the newly-created position of supervisor of mail, baggage and express traffic, with headquarters at St. Louis, Mo.

W. A. Reese, commercial agent for the Seaboard Air Line, with headquarters at Baltimore, Md., has been appointed New England freight agent, with headquarters at Boston, Mass., succeeding **F. J. Cooke,** who has retired from active duty after 31 years of service with this company.

J. E. Bolin, district passenger agent for the Southern Pacific, with headquarters at Detroit, Mich., has been promoted to general agent, with headquarters at Denver, Colo., to succeed **T. E. Williams,** who has been transferred to Kansas City, Mo., to replace **J. G. Lowe,** who has retired.

Edward G. Gustafson, who has been appointed assistant traffic manager of the Minneapolis & St. Louis, with headquarters at Chicago as reported in the *Railway Age* of August 22, has been identified with the M. & St. L. for 22 years. He was born on July 21, 1891, at Aurora, Ill., and entered the service of the M. &

Root

Edward G. Gustafson

St. L. in August, 1914, as chief clerk in the Chicago office. Three years later he was advanced to traveling freight agent, and in 1920 he was appointed general agent at Cleveland, Ohio. Six years later he was transferred to Chicago, and in February, 1935, he was promoted to assistant general freight agent, with the same headquarters, the position he was holding at the time of his appointment as assistant traffic manager at Chicago.

G. G. Early, who has been appointed chief traffic officer of the Wabash, as reported in the *Railway Age* of August 29, was born on July 25, 1881, at Pittsburgh, Pa., and entered railway service in 1900 with the Erie in a clerical capacity. In 1907 he went with the Wabash as chief rate clerk of the lines east of Toledo, Ohio, including the West Side Belt and the Wabash Pittsburgh terminal. In 1917 he became identified with the Pittsburgh & West Virginia as general freight and passenger agent, being appointed assistant general freight agent in 1918. Two years later he returned to the Wabash to reopen

Root

G. G. Early

an off-line office at Philadelphia, Pa., and in 1921 he was advanced to assistant general freight agent at St. Louis, Mo., being promoted to general freight agent with the same headquarters in 1924. On January 1, 1927, Mr. Early was appointed assistant freight traffic manager and in 1931 he was further advanced to freight traffic manager, which position he was holding at the time of his recent appointment. His office is at St. Louis.

ENGINEERING AND SIGNALING

H. G. Watkins, engineer maintenance of way of the Akron, Canton & Youngstown with headquarters at Akron, Ohio, has been appointed chief engineer, with the same headquarters. The position of engineer maintenance of way has been abolished.

R. D. Pierson, assistant division engineer on the Atchison, Topeka & Santa Fe, with headquarters at San Francisco, Cal., has been promoted to division engineer with headquarters at Winslow, Ariz., to replace **R. C. Kline,** whose promotion to assistant superintendent is noted elsewhere in these columns. **George W. Varnum,** roadmaster at Kingman, Ariz., has been promoted to assistant division engineer at San Francisco, to succeed Mr. Pierson.

D. W. Fuller, assistant signal engineer of the Eastern lines of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has been promoted to signal engineer of the same lines with the same headquarters, to succeed **H. Hobson,** who has retired at his own request. **J. A. Parkinson,** chief draftsman in the office of the signal engineer of the Santa Fe System at Topeka, has been appointed assistant signal engineer of the Eastern lines, to succeed Mr. Fuller.

Mr. Hobson had been in railroad service for about 38 years. He was born in County Kildare, Ireland, in 1855. He first came to the United States in 1886, and after about a year he entered the service of the Chicago, Burlington & Quincy as a trucker in the Chicago freight house, serving with this company in various capacities until 1892, when he returned to Ireland and remained six years. In 1897 he again came to the United States and joined the signal department of the Santa Fe. Shortly thereafter he entered the operating department, but after a brief period as a locomotive fireman he returned to the signal department as a lamp inspector. From this position he progressed to lamp and way-car inspector, general foreman, signal supervisor, Eastern Lines, and eventually to signal engineer of the Eastern Lines.

MOTOR TRANSPORT

Berne Levy has been appointed manager of the Santa Fe Transportation Company (motor truck operating subsidiary of the Atchison, Topeka & Santa Fe), with headquarters at Los Angeles, Cal., to succeed **W. T. Quirk,** who has been assigned to other duties.

SPECIAL

Dr. George H. Curfman has been appointed acting chief surgeon of the Denver & Rio Grande Western, with headquarters at Denver, Colo., succeeding **Dr. John F. Roe,** who has been granted an indefinite leave of absence.

Harry W. Frier, assistant advertising manager of the Chicago & North Western, with headquarters at Chicago, has resigned to enter the employ of the J. Stirling Getchell Advertising Agency, Detroit, Mich., to handle publicity for De Soto automobiles.

OBITUARY

John A. Turtle, who retired in 1933 as master mechanic on the Union Pacific at Denver, Colo., died at that point on August 26.

Ralph Jones, assistant superintendent on the Atchison, Topeka & Santa Fe, with headquarters at Prescott, Ariz., died on July 22.

Eugene C. Bagwell, chief operating officer of the Seaboard Air Line, with headquarters at Norfolk, Va., died on September 6 at Southern Pines, N. C., where he was vacationing. Death was attributed to heart disease.

Ray P. DeCamp, general commerce agent of the Illinois Central with headquarters at Chicago, died on September 7 at Akron, Ohio. Mr. DeCamp was 51 years old and had been connected with the Illinois Central for 33 years.

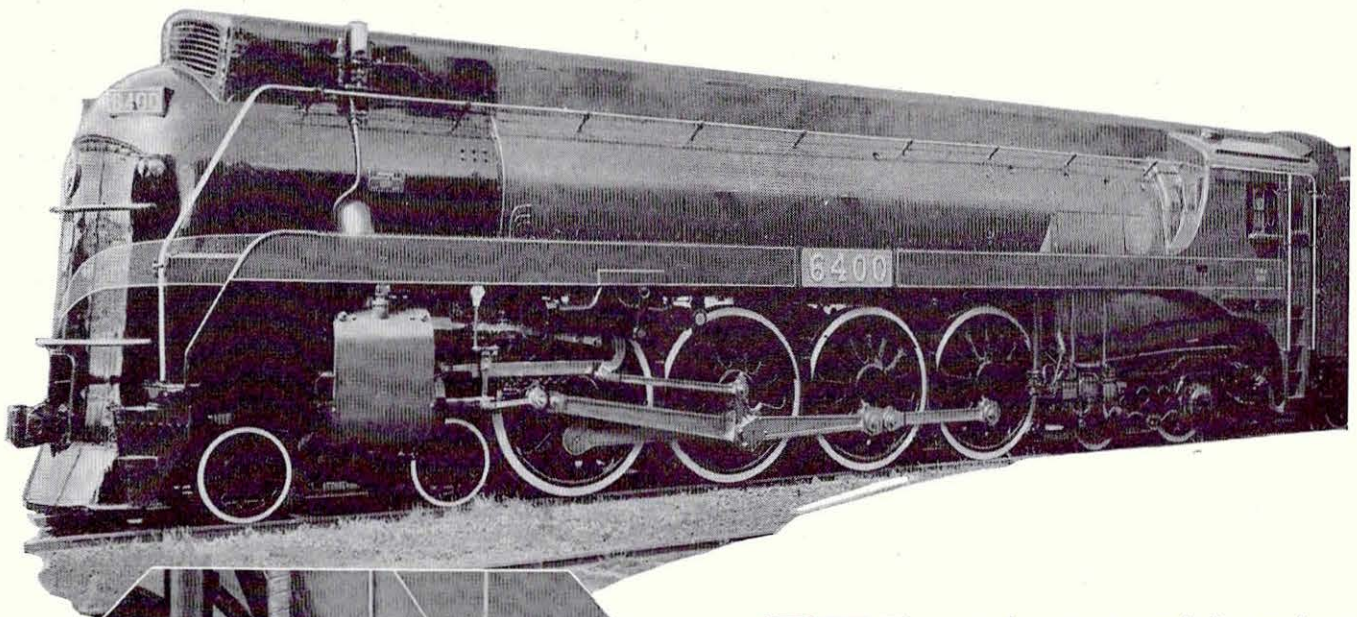
H. G. E. Pansius, foreign freight agent of the Delaware, Lackawanna & Western, with headquarters at New York, died on September 5 after being struck by a Lackawanna train at Madison, N. J. Mr. Pansius was 47 years old.

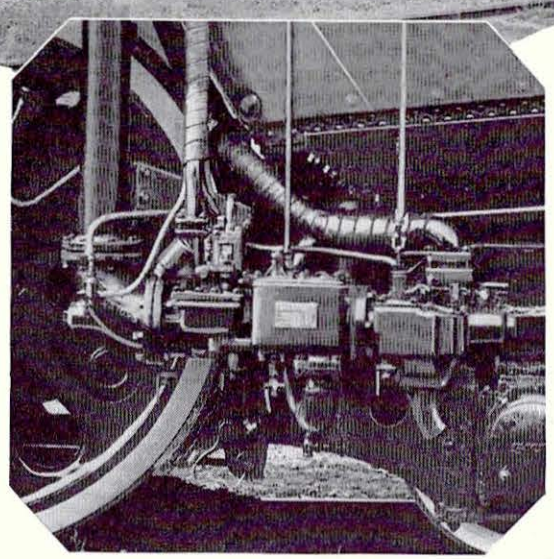
Tables of Revenues and Expenses of Railways begin on next left-hand page

ELESCO EXHAUST STEAM INJECTORS

Applied to the new

Canadian National Railways' Locomotives





THE Elesco exhaust steam injector is a feed water heater, operating on the injector principle.

FEATURES THAT MERIT YOUR CONSIDERATION

Low in first cost
Light in weight
Easy to apply
Easy to maintain
Fuel and water savings 8%-12%
Reliable as a boiler feed

★ ★ ★

More than 20,000 exhaust steam injectors are in service on railways throughout the world.

★ ★ ★

The TREND is towards the Elesco exhaust steam injector—readily applied to both new and existing locomotives. Write today for particulars.

THE SUPERHEATER COMPANY

Representative of American Throttle Company, Inc.

60 East 42nd Street, NEW YORK
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A-1090

Revenues and Expenses of Railways

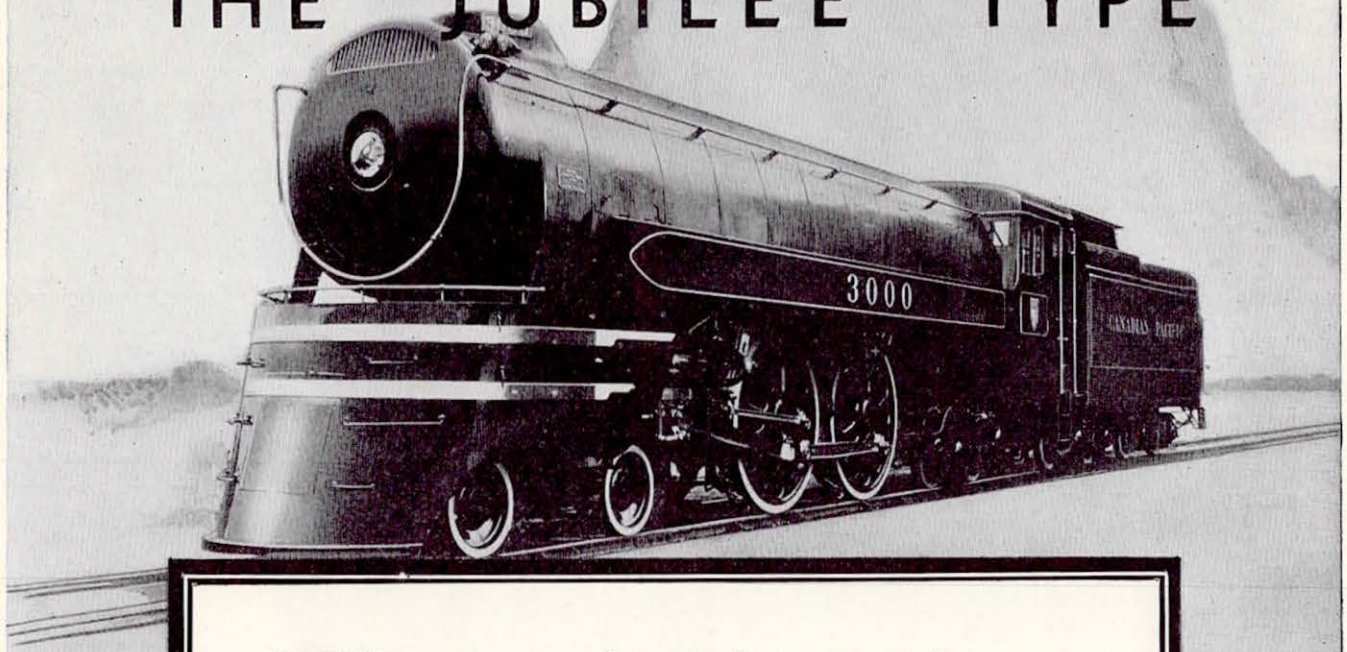
MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1936

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After dep. & retir. 1936	After dep. & retir. 1935	Before depr. & ret.
Akron, Canton & Youngstown	July	171	$170,399	$31	$179,094	$31,518	$14,288	$8,589	$51,975	$115,152	64.3	$63,942	$51,139	$33,219	$15,132	$37,657
	7 mos.	171	1,203,970	278	1,281,253	202,664	113,970	58,749	366,819	806,409	62.9	474,844	390,743	259,492	204,280	290,821
Alton	July	956	1,166,873	184,961	1,508,531	296,994	200,220	55,735	534,838	1,137,996	75.4	370,535	289,003	91,185	—197,191	121,188
	7 mos.	956	6,688,973	1,171,193	9,033,778	1,338,802	1,517,517	334,986	3,561,694	7,167,095	79.3	1,866,683	1,264,962	51,062	—723,348	251,372
Atchison, Topeka & Santa Fe System	July	13,227	13,006,191	1,660,096	15,688,531	2,232,064	3,065,208	456,609	4,730,726	10,898,758	69.5	4,789,773	3,567,723	3,689,554	2,316,372	4,635,720
	7 mos.	13,232	69,116,674	8,845,836	85,185,354	13,436,578	20,318,704	2,997,647	30,634,421	70,438,355	82.7	14,746,999	7,126,540	7,424,444	7,044,622	14,044,981
Atlanta & West Point	July	93	112,737	24,754	157,113	21,537	31,295	8,352	63,097	134,073	85.3	23,040	16,131	—1,178	1,532	7,746
	7 mos.	93	686,254	154,625	992,934	130,739	199,706	56,788	417,453	871,556	87.9	121,378	72,361	—27,692	—58,321	—36,353
Western of Alabama	July	133	87,680	24,496	125,569	17,879	31,911	7,102	51,850	116,686	92.9	8,883	254	579	—12,537	13,362
	7 mos.	133	608,005	156,948	867,442	138,809	216,382	49,007	355,776	816,932	94.2	50,510	—10,028	2,738	—74,976	94,132
Atlanta, Birmingham & Coast	July	639	287,020	12,013	327,478	45,570	50,244	22,515	107,975	249,450	76.2	78,028	61,321	46,236	37,589	57,613
	7 mos.	639	1,573,012	136,274	1,926,632	303,236	349,742	153,666	751,140	1,729,439	89.8	197,193	98,242	—11,145	—71,064	71,905
Atlantic Coast Line	July	5,107	2,192,552	386,528	2,887,143	351,133	666,395	118,606	1,260,156	2,520,808	87.3	366,335	141,335	129,187	—282,962	304,663
	7 mos.	5,139	18,552,760	4,593,240	26,200,701	2,808,941	4,809,174	899,365	10,218,451	19,970,953	76.2	6,229,748	3,154,748	2,299,809	1,413,165	3,541,962
Charleston & Western Carolina	July	342	204,871	1,451	210,843	25,502	30,088	6,857	60,172	127,767	60.6	83,076	61,076	61,492	18,974	67,714
	7 mos.	342	1,261,503	8,360	1,303,307	181,746	198,918	45,140	421,577	882,341	67.7	420,966	290,966	272,687	210,434	316,629
Baltimore & Ohio	July	6,486	12,674,815	1,075,819	14,535,536	1,403,566	3,386,478	414,212	4,739,142	10,640,111	73.2	3,895,425	2,992,636	2,513,625	1,258,469	3,128,464
	7 mos.	6,486	82,139,186	6,311,647	94,001,562	8,346,265	22,417,824	2,705,237	32,558,068	7,079,968	75.3	23,201,594	17,362,623	14,627,880	12,455,522	18,937,197
Staten Island Rapid Transit	July	23	41,978	84,878	136,220	13,977	21,875	2,076	82,167	132,372	97.2	3,848	—17,952	—31,924	—37,169	—24,507
	7 mos.	23	322,987	549,312	926,287	91,775	146,684	12,550	598,625	936,661	101.1	—10,374	—157,124	—262,720	—321,160	—210,815
Bangor & Aroostook	July	603	214,719	17,139	249,946	92,492	80,843	5,781	98,395	300,431	120.2	—50,485	—72,023	—64,171	—50,646	—41,240
	7 mos.	603	3,400,732	135,877	3,681,382	676,510	621,654	37,715	955,725	2,457,123	66.7	1,224,259	857,291	828,432	1,283,478	983,939
Bessemer & Lake Erie	July	225	1,727,460	4,334	1,747,822	118,479	271,783	11,978	223,377	663,388	38.	1,084,434	786,995	799,424	407,634	853,557
	7 mos.	225	7,201,261	25,633	7,315,300	834,646	1,921,708	80,613	1,237,182	4,342,532	59.4	2,972,768	2,213,343	2,486,701	1,276,746	2,863,292
Boston & Maine	July	1,988	2,663,572	655,951	3,818,283	493,129	541,576	82,012	1,552,679	2,858,902	74.9	959,381	664,787	489,506	353,726	625,965
	7 mos.	1,994	18,657,594	3,858,329	25,976,660	4,577,527	4,405,000	457,418	10,920,952	21,685,312	83.5	4,291,348	2,361,039	992,389	3,318,740	1,950,224
Brooklyn Eastern District Terminal	July	12.41	112,674	.....	114,629	6,950	13,970	290	30,856	58,228	50.8	56,401	48,180	48,180	27,827	.....
	7 mos.	12.41	729,715	.....	745,498	36,874	68,675	3,646	207,294	360,910	48.4	384,588	326,786	327,722	220,811	.....
Burlington-Rock Island	July	255	58,007	7,498	70,331	13,911	10,463	3,398	39,644	74,588	106.5	—4,257	—11,665	—18,899	—43,171	—16,930
	7 mos.	255	385,675	34,955	456,463	104,696	85,126	26,663	260,581	528,868	115.9	—72,405	—122,063	—181,569	—229,215	—166,716
Cambria & Indiana	July	37	98,103	.....	98,256	13,547	39,514	381	10,740	70,954	72.2	27,302	—12,810	60,386	54,523	75,919
	7 mos.	37	682,833	.....	683,946	59,396	429,215	2,652	86,303	617,870	90.34	66,076	—79,488	408,644	524,268	518,911
Canadian Pacific Lines in Maine	July	233	90,823	19,354	125,019	40,198	26,438	9,791	55,987	140,231	112.1	—15,212	—24,471	—39,045	—35,929	—36,969
	7 mos.	233	1,188,410	101,570	1,375,845	300,477	305,802	67,475	546,085	1,271,951	92.4	103,894	41,142	—108,709	—66,756	—94,273
Canadian Pacific Lines in Vermont	July	85	59,386	12,940	86,701	18,474	23,183	4,358	52,776	104,440	120.5	—17,739	—24,976	—43,496	—39,429	—43,496
	7 mos.	85	439,058	56,947	574,315	143,467	191,671	30,068	405,101	809,583	141.0	—235,268	—284,323	—413,871	—296,901	—413,871
Central of Georgia	July	1,926	1,133,327	134,014	1,385,496	164,151	289,240	52,091	528,731	1,115,153	80.5	270,343	165,559	149,694	63,583	213,812
	7 mos.	1,926	7,137,832	797,166	8,954,147	1,125,522	1,925,123	367,054	3,673,163	7,668,122	85.6	1,286,025	602,663	417,786	220,875	867,000
Central of New Jersey	July	681	1,896,195	497,118	2,555,774	200,557	407,764	53,738	1,083,006	1,861,824	72.8	693,950	225,057	113,711	36,744	239,852
	7 mos.	681	14,348,961	2,550,646	18,028,420	1,393,321	3,538,562	331,989	7,739,759	13,816,546	76.6	4,211,874	1,704,729	709,663	1,815,503	1,602,541
Central Vermont	July	453	445,669	42,282	527,914	104,177	102,966	14,451	240,173	484,690	91.8	43,224	20,680	25,789	25,337	51,354
	7 mos.	454	2,821,445	216,106	3,318,319	624,607	670,667	101,430	1,661,569	3,219,207	97.0	99,112	—29,659	—27,524	184,956	162,430
Chesapeake & Ohio	July	3,106	10,455,305	293,885	11,186,874	1,071,940	1,985,165	199,525	2,352,382	5,924,088	53.0	5,262,786	3,977,915	3,899,748	2,124,737	4,600,805
	7 mos.	3,106	69,980,783	1,908,415	74,470,758	7,215,020	13,621,896	1,337,026	16,224,989	40,636,534	54.6	33,834,224	26,481,260	26,688,153	19,857,617	31,601,015
Chicago & Eastern Illinois	July	931	1,032,338	131,511	1,309,163	159,817	210,356	56,896	471,094	961,781	73.5	347,382	272,382	128,707	—143,635	177,256
	7 mos.	931	7,098,591	730,425	8,887,111	1,025,842	1,558,901	388,435	3,429,532	6,846,099	77.0	2,041,012	1,516,012	522,299	64,633	867,655
Chicago & Illinois Midland	July	131	311,379	1,086	328,328	33,842	47,791	16,404	72,525	186,953	56.9	141,375	122,238	119,349	63,166	132,958
	7 mos.	131	1,943,106	9,142	2,006,183	192,473	376,709	118,775	515,963	1,325,795	66.1	680,388	573,407	575,733	501,455	671,085
Chicago & North Western	July	8,355	6,651,236	1,218,663	8,640,566	1,724,535	1,904,947	236,406	3,044,674	7,257,249	84.0	1,383,317	774,630	605,497	—465,887	1,023,634
	7 mos.	8,355	39,197,129	5,940,214	50,401,821	9,524,787	12,119,997	1,190,330	20,491,795	45,675,412	90.6	4,726,409	345,033	—964,971	—190,614	1,951,647
Chicago, Burlington & Quincy	July	9,014	7,701,593	897,289	9,401,251	1,367,073	1,456,113	252,803	2,903,272	6,340,641	67.4	3,060,610	2,349,076	1,925,570	438,671	2,306,842
	7 mos.	9,013	43,465,889	4,457,816	53,364,497	7,580,074	9,736,878	1,665,351	19,531,091	40,995,722	76.8	12,368,775	7,769,839	5,147,191	1,091,698	7,823,552
Chicago Great Western	July	1,512	1,506,227	46,418	1,662,180	231,119	174,319	54,550	565,295	1,077,875	64.8	584,305	494,434	302,231	—19,001	344,272
	7 mos.	1,512	8,981,475	323,787	9,977,981	1,535,504	1,416,042	370,546	3,905,958	7,594,598	76.1	2,383,383	1,852,970	569,015	—66,520	859,076
Chicago, Indianapolis & Louisville	July	572	715,478	47,903	849,858	90,178	201,484	28,300	318,439	672,681	79.2	177,177	132,705	29,771	—68,894	70,463
	7 mos.	572	4,798,409	346,554	5,784,652	535,428	1,394,480	199,949	2,286,476	4,661,739	80.6	1,122,913	845,586	117,955	—124,630	408,236

Continued on next left-hand page

"A POEM IN STEEL"

THE "JUBILEE" TYPE

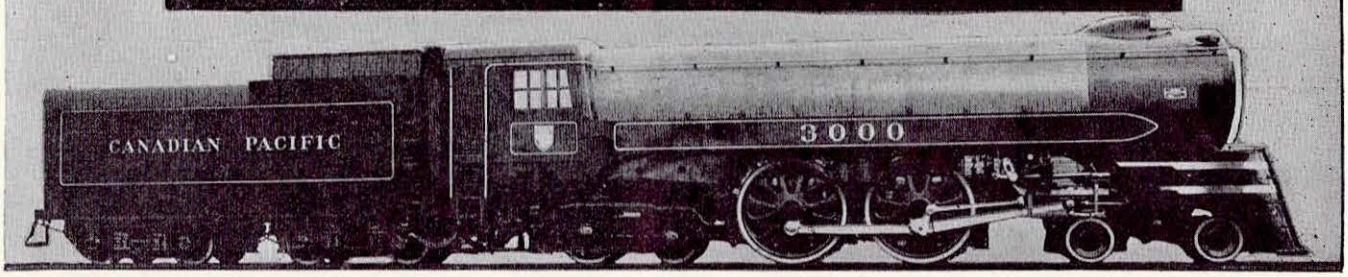


"THIS occasion, in truth, marks the beginning of a new era in the Canadian transportation field. We have here a new engine, a locomotive designed and built in keeping with our modern needs. It is progress within the best meaning of that term, and as such is important. . . . This, as you are all aware, is the Fiftieth Anniversary year of the Canadian Pacific Railway's transcontinental passenger service. During those fifty years the construction, operation, and maintenance of the steam locomotive played an important part in the development of our country and the Canadian Pacific Railway Company. It is fitting therefore, and I believe a matter for proper pride, that in constructing a new type of locomotive the company should honor it and the progress it represents by naming it the Jubilee type."

Sir Edward Beatty, G.B.E., K.C., LL.D.
Chairman and President, in accepting the new flying ace of the steel rails on behalf of the company.

MONTREAL LOCOMOTIVE WORKS, LIMITED

MONTREAL CANADA



Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After dep.& retir. 1936	After dep.& retir. 1935	Before depr.& ret.
Chicago, Milwaukee, St. Paul & Pac.	July	11,128	$8,086,421	$804,123	$9,757,458	$1,919,926	$1,635,985	$223,457	$3,411,259	$7,544,848	77.3	$2,212,610	$1,475,610	$925,463	—$1,082,949	$1,371,783
	7 mos.	11,127	50,416,133	4,030,982	60,016,120	10,294,265	11,420,870	1,450,468	23,246,574	48,722,777	81.2	11,293,343	6,550,343	3,048,640	20,655	6,183,678
Chicago, Rock Island & Pacific	July	7,576	5,976,712	627,524	7,191,636	981,615	1,495,092	209,464	2,596,073	5,669,595	78.8	1,522,041	1,053,107	689,631	104,886	1,045,883
	7 mos.	7,574	33,783,703	3,930,907	41,845,805	5,497,616	10,223,162	1,378,458	17,953,199	37,786,411	90.3	4,059,394	825,951	—1,240,327	—1,565,021	1,267,829
Chicago, Rock Island & Gulf	July	626	330,277	29,016	436,531	59,666	36,228	16,354	132,015	269,889	61.8	166,642	142,514	69,942	38,747	73,902
	7 mos.	626	1,759,770	190,920	2,482,004	373,960	244,363	112,172	895,456	1,809,174	72.4	672,830	518,422	154,142	—39,252	182,526
Chicago, St. Paul, Minneap. & Omaha	July	1,648	1,390,803	173,393	1,685,007	190,000	283,469	41,214	691,609	1,283,114	76.2	401,893	294,081	168,611	—100,448	218,090
	7 mos.	1,648	8,486,197	898,411	10,107,912	1,218,168	1,790,711	248,208	4,919,979	8,720,071	86.3	1,387,841	684,815	—61,114	—423,037	287,243
Clinchfield Railroad	July	309	481,477	5,631	492,113	39,600	129,451	17,515	93,194	293,034	59.5	199,079	145,320	190,171	96,036	233,202
	7 mos.	309	3,417,615	30,246	3,485,399	276,336	812,684	122,267	694,646	2,008,373	57.6	1,477,026	1,157,857	1,415,169	1,009,352	1,719,743
Colorado & Southern	July	956	537,652	44,285	635,966	88,174	112,821	14,285	250,047	502,508	79.0	133,458	67,242	35,188	2,944	66,690
	7 mos.	1,012	3,300,618	205,664	3,870,394	481,588	780,168	91,318	1,599,890	3,195,496	82.6	674,898	233,683	85,967	—221,719	307,344
Fort Worth & Denver City	July	902	492,793	60,873	553,354	51,437	83,155	19,610	150,599	342,050	61.8	211,304	171,496	137,127	66,406	154,549
	7 mos.	902	2,957,034	292,629	3,251,699	298,074	595,720	125,897	1,056,879	2,325,606	71.5	926,093	687,918	478,529	113,949	602,114
Columbus & Greenville	July	167	72,912	7,410	85,941	17,439	15,303	4,035	32,666	79,830	92.9	6,111	3,068	2,711	—1,254	5,496
	7 mos.	167	529,883	41,765	608,340	119,717	103,577	26,321	243,217	563,259	92.6	45,081	22,070	14,403	—29,958	33,953
Delaware & Hudson	July	830	1,749,804	120,148	1,966,245	291,898	508,834	46,226	694,164	1,664,611	84.7	301,634	158,001	158,223	—152,689	248,709
	7 mos.	831	13,046,158	632,568	14,284,823	1,941,734	3,510,229	320,604	5,386,178	12,096,949	84.7	2,187,874	1,254,794	1,317,309	1,085,162	1,961,473
Delaware, Lackawanna & Western	July	984	2,961,868	610,559	4,055,411	479,722	806,437	114,761	1,773,610	3,355,062	82.7	700,349	365,349	343,783	—517,335	565,749
	7 mos.	988	21,311,776	4,016,057	28,504,351	2,612,480	5,371,977	811,319	12,960,732	23,054,216	80.8	5,450,135	3,106,135	2,987,532	1,800,237	4,545,833
Denver & Rio Grande Western	July	2,584	1,657,973	204,379	1,971,599	481,205	585,010	60,446	698,442	1,862,637	94.5	108,962	—82,195	—148,028	—36,314	—52,607
	7 mos.	2,584	11,424,252	824,453	12,911,946	2,231,045	3,881,145	367,700	4,499,992	11,490,921	89.0	1,421,025	109,929	—261,659	196,954	411,989
Denver & Salt Lake	July	232	116,260	9,133	134,345	46,010	64,755	2,648	49,529	161,002	119.8	—26,657	—48,004	—431	34,877	4,511
	7 mos.	232	1,254,788	55,243	1,370,036	249,303	469,323	16,085	378,193	1,144,311	83.5	225,725	85,658	361,114	505,371	397,396
Detroit & Mackinac	July	242	67,981	3,787	78,722	14,882	12,634	1,168	24,344	56,739	72.1	21,983	18,995	15,541	1,376	18,406
	7 mos.	242	322,101	20,201	383,947	72,766	74,995	6,678	158,877	337,007	87.8	46,940	38,753	16,525	—11,123	37,078
Detroit & Toledo Shore Line	July	50	252,401	.....	253,415	31,928	23,700	7,968	65,499	136,407	53.8	117,008	94,120	48,350	42,030	53,910
	7 mos.	50	2,311,789	.....	2,322,532	199,134	182,755	54,705	550,825	1,039,354	44.8	1,283,178	1,055,757	661,473	586,327	700,388
Detroit, Toledo & Ironton	July	472	624,658	254	644,125	69,992	85,038	10,668	130,642	322,312	50.0	321,813	271,934	234,386	165,070	256,028
	7 mos.	472	4,620,556	1,711	4,727,347	432,815	584,690	74,346	985,945	2,250,887	47.6	2,476,460	2,004,630	1,733,212	2,081,857	1,885,570
Duluth, Missabe & Northern	July	558	2,365,463	2,674	2,720,376	171,430	218,813	4,470	346,334	787,357	28.9	1,933,019	1,710,727	1,707,673	1,065,841	1,782,419
	7 mos.	559	7,192,597	17,571	8,237,498	960,610	1,473,559	26,258	1,559,623	4,345,810	52.8	3,891,688	2,807,427	2,805,873	1,807,237	3,330,441
Duluth, Winnipeg & Pacific	July	178	90,609	2,585	96,576	39,878	16,333	1,873	41,348	103,758	107.4	—7,182	—14,629	—26,536	—34,127	—23,488
	7 mos.	178	748,928	13,975	782,552	176,353	127,967	12,617	321,369	668,573	85.4	113,979	60,826	—51,461	—105,021	—29,225
Elgin, Joliet & Eastern	July	434	1,274,501	2	1,556,059	154,231	350,089	14,358	556,633	1,121,966	72.1	434,093	306,041	258,046	87,240	332,686
	7 mos.	434	9,101,911	14	10,513,483	966,133	2,243,954	96,886	3,721,651	7,356,067	70.0	3,157,416	2,300,570	2,111,705	1,504,223	2,636,545
Erie	July	2,297	6,222,748	511,256	7,286,527	676,232	1,298,546	176,168	2,522,242	4,979,257	68.3	2,307,270	1,776,473	1,458,984	460,896	1,781,143
	7 mos.	2,297	40,610,938	3,040,674	47,215,865	3,980,324	8,960,685	1,187,334	17,386,535	33,637,395	71.2	13,578,470	10,454,395	8,694,646	6,445,232	10,963,094
New Jersey & New York	July	45	14,822	47,525	64,402	6,104	16,326	763	46,664	72,519	112.6	—8,117	—13,411	—30,626	—35,189	—30,615
	7 mos.	45	113,693	336,522	463,680	35,032	106,183	4,386	343,347	501,751	108.2	—38,071	—71,583	—183,905	—254,041	—183,828
N. Y., Susquehanna & Western	July	215	249,783	25,370	286,321	28,863	32,364	4,811	115,807	195,346	68.2	90,975	65,785	34,153	39,851	39,726
	7 mos.	215	1,807,656	169,427	2,066,046	186,244	249,717	33,400	896,609	1,461,195	70.7	604,851	439,577	247,326	254,357	287,602
Florida East Coast	July	712	244,992	84,871	378,922	102,210	140,673	20,557	155,692	463,394	122.3	—84,472	—162,989	—178,990	—196,260	—121,753
	7 mos.	712	3,364,467	1,648,085	5,621,359	704,601	912,139	159,980	1,761,426	3,929,746	69.9	1,691,613	1,142,120	818,121	344,175	1,219,669
Fort Smith & Western	July	249	53,191	1,374	57,673	17,222	7,431	6,116	19,256	53,006	91.9	4,667	3,667	—3,609	—11,882	—3,043
	7 mos.	249	385,243	6,915	415,370	107,635	60,943	38,333	139,097	368,731	88.8	46,639	35,858	—11,202	—57,813	—7,224
Georgia Railroad	July	329	282,146	18,785	322,927	29,804	65,606	18,036	134,673	262,280	81.2	60,647	54,234	58,203	31,046	69,567
	7 mos.	329	1,799,290	94,697	2,057,608	203,439	423,879	121,078	889,419	1,733,741	84.3	323,867	279,643	337,098	295,756	417,004
Georgia & Florida	July	408	78,338	3,368	85,257	22,868	17,397	8,426	35,850	90,269	105.9	—5,012	—12,161	—11,872	—11,801	—6,671
	7 mos.	408	570,577	15,975	613,863	159,767	116,866	58,093	242,048	616,349	100.4	—2,486	—48,688	—56,082	—23,619	—19,436
Grand Trunk Western	July	1,032	1,691,305	86,356	1,902,632	277,465	369,883	36,979	739,162	1,510,882	79.4	391,750	259,509	9,435	146,029	98,226
	7 mos.	1,032	12,719,676	504,888	14,206,400	1,638,742	2,608,392	247,804	5,466,288	10,578,831	74.5	3,627,569	2,867,367	2,224,956	1,272,869	2,889,659
Canadian Nat'l Lines in New Eng.	July	172	90,964	14,132	115,032	35,394	19,764	2,576	55,890	122,949	106.9	—7,917	—23,389	—49,959	—58,217	—46,917
	7 mos.	172	648,804	40,022	753,917	281,305	146,066	17,116	417,395	925,371	122.7	—171,454	—274,068	—463,540	—473,686	—442,705
Great Northern	July	8,176	7,653,509	625,749	9,040,108	1,061,428	1,307,801	188,355	2,478,996	5,354,158	59.2	3,685,950	2,795,301	2,710,986	1,771,389	3,014,806
	7 mos.	8,229	39,105,768	2,871,365	45,927,037	4,741,926	8,009,876	1,260,599	15,777,380	31,705,495	69.0	14,221,542	10,025,426	9,520,246	7,559,475	11,666,667

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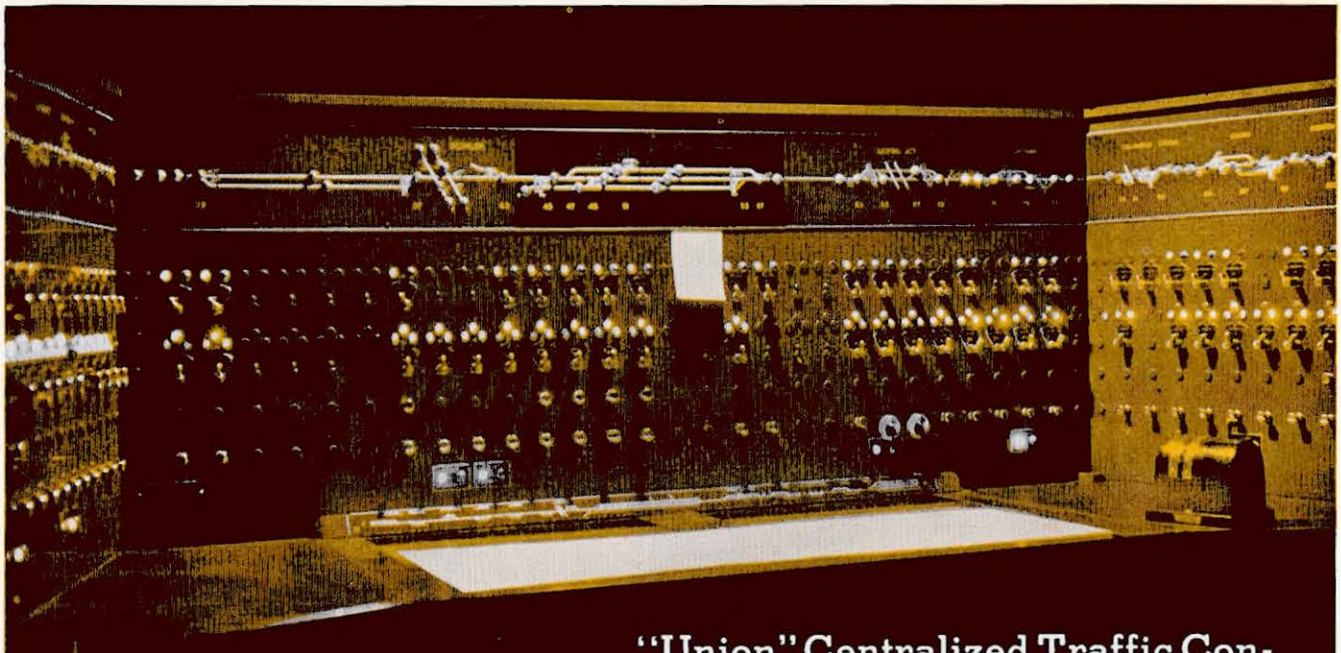

"Union" Centralized Traffic Control has proved itself as a self-liquidating investment, whether applied to a single switch, a gauntlet or an entire division.

CUT TRANSPORTATION COSTS

NEW YORK
MONTREAL
CHICAGO
ST. LOUIS
SAN FRANCISCO

Union Switch & Signal Co.
SWISSVALE, PA.

1122

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After dep.& retir. 1936	1935	Before depr.& ret.
Green Bay & Western	July	234	$137,233	$1,064	$146,564	$32,812	$13,257	$5,806	$46,296	$101,720	69.4	$44,844	$33,725	$27,087	$7,577	$30,986
	7 mos.	234	883,056	5,690	926,771	202,353	107,904	41,035	316,132	695,870	75.0	230,901	163,410	114,188	81,970	142,603
Gulf & Ship Island	July	259	98,670	11,668	120,856	19,352	25,723	3,503	62,738	116,283	96.2	4,573	—10,802	—20,502	—13,916	—16,588
	7 mos.	259	691,232	60,040	840,778	126,165	113,788	23,859	418,088	724,013	86.1	116,765	11,977	—56,884	—64,179	—28,844
Gulf, Mobile & Northern	July	936	536,759	31,660	590,645	68,547	79,787	37,233	152,664	370,211	62.68	220,434	173,434	110,793	82,993	129,988
	7 mos.	936	3,693,230	168,363	4,024,502	434,772	610,763	249,381	1,082,413	2,580,622	64.12	1,443,880	1,112,101	689,578	487,179	822,819
Illinois Central	July	4,972	6,829,555	791,328	8,202,071	840,162	1,841,050	235,335	2,877,082	6,210,681	75.7	1,991,390	1,354,078	1,132,293	243,116	1,671,863
	7 mos.	4,975	45,363,748	5,132,511	55,057,047	5,057,177	12,298,022	1,607,315	21,078,624	42,905,273	77.9	12,151,774	7,913,537	6,409,198	5,389,767	10,236,993
Yazoo & Mississippi Valley	July	1,619	1,044,867	90,658	1,205,489	119,444	253,980	34,513	442,729	909,214	75.4	296,275	160,663	63,981	—61,447	108,209
	7 mos.	1,619	6,994,240	471,030	8,018,157	679,017	1,340,378	235,386	3,163,362	5,804,159	72.4	2,213,998	1,291,443	676,917	—100,777	977,161
Illinois Central System	July	6,592	7,874,422	881,986	9,407,560	959,606	2,095,030	269,848	3,319,811	7,119,895	75.7	2,287,665	1,514,342	1,207,671	186,669	1,791,469
	7 mos.	6,595	52,357,988	5,603,541	63,075,204	5,736,194	13,638,400	1,842,701	24,241,986	48,709,432	77.2	14,365,772	9,192,678	7,149,874	5,338,065	11,277,913
Illinois Terminal	July	508	349,459	64,731	458,259	58,163	68,444	16,740	148,892	308,269	67.26	149,990	107,391	88,290	78,686	107,365
	7 mos.	513	2,634,149	477,139	3,377,544	349,624	466,578	112,749	1,113,674	2,167,436	64.17	1,210,108	960,571	832,259	573,662	965,392
Kansas City Southern	July	878	1,123,108	24,431	1,257,451	105,236	198,837	48,081	334,313	757,776	60.3	499,675	401,175	330,227	125,464	359,521
	7 mos.	878	6,775,918	122,778	7,614,312	654,589	1,163,410	336,488	2,134,478	4,769,346	62.6	2,844,966	2,244,466	1,800,262	558,278	2,002,030
Kansas, Oklahoma & Gulf	July	326	232,124	685	235,617	34,159	25,483	8,098	63,039	103,946	44.1	131,671	106,657	79,594	44,362	81,684
	7 mos.	326	1,385,709	3,580	1,407,587	174,849	153,008	54,442	313,133	671,804	47.7	735,783	593,139	458,110	264,404	472,718
Lake Superior & Ishpeming	July	160	378,024	92	435,816	35,360	19,991	787	54,578	116,723	26.8	319,093	254,516	252,944	167,343	266,261
	7 mos.	160	1,196,889	653	1,362,329	189,261	189,274	4,193	244,035	668,954	49.1	693,375	465,245	455,758	187,090	548,857
Lehigh & Hudson River	July	96	122,763	140	123,447	20,468	15,712	3,826	54,145	100,443	81.4	23,004	11,667	—299	10,941	3,437
	7 mos.	96	893,149	802	899,275	108,838	137,541	25,311	339,180	656,783	73.0	242,492	155,961	69,492	111,701	95,996
Lehigh & New England	July	218	295,732	318	299,252	33,599	69,833	6,056	104,680	228,902	76.5	70,350	55,398	52,557	50,739	70,731
	7 mos.	219	2,275,893	2,006	2,296,002	240,437	500,782	43,369	812,745	1,706,211	74.3	589,791	456,386	445,358	569,535	572,211
Lehigh Valley	July	1,331	3,466,527	228,788	3,948,634	213,902	608,802	116,966	1,601,640	2,713,184	68.7	1,235,450	1,024,755	858,443	—230,007	1,049,019
	7 mos.	1,335	24,211,955	1,511,709	27,566,942	1,744,374	4,769,166	785,965	11,994,305	20,448,800	74.2	7,118,142	5,681,684	4,472,572	2,883,308	5,813,523
Louisiana & Arkansas	July	606	488,477	12,261	516,957	76,146	66,052	28,273	117,005	306,870	59.4	210,087	163,588	140,576	113,285	154,862
	7 mos.	606	3,091,176	68,870	3,279,289	443,859	454,864	195,599	812,607	2,023,515	61.7	1,255,774	960,653	803,985	570,060	904,330
Louisiana, Arkansas & Texas	July	255	102,744	467	109,869	28,438	10,144	4,935	35,993	83,969	76.4	25,900	21,293	4,776	7,677	5,547
	7 mos.	255	698,616	1,685	733,138	190,914	71,685	32,494	228,152	554,450	75.6	178,688	149,944	39,810	13,766	45,052
Louisville & Nashville	July	4,990	6,150,650	637,858	7,247,562	789,849	1,599,125	174,124	2,370,371	5,250,118	72.4	1,997,444	1,598,578	1,614,784	953,813	1,962,477
	7 mos.	5,002	42,708,762	3,637,502	49,931,475	5,161,950	11,505,439	1,269,210	16,945,273	37,098,769	74.3	12,832,706	9,659,052	9,756,548	7,219,471	12,195,578
Maine Central	July	1,046	747,689	112,759	963,041	167,505	157,884	13,204	362,018	738,872	76.7	224,169	158,443	130,756	138,382	175,068
	7 mos.	1,046	5,764,413	539,672	6,948,467	1,294,319	1,239,077	80,306	2,682,404	5,573,712	80.2	1,374,755	922,086	512,923	953,133	824,805
Midland Valley	July	351	125,449	9	127,587	17,744	14,622	2,280	31,057	70,537	55.3	57,050	47,484	38,778	43,223	40,911
	7 mos.	355	806,877	103	819,645	108,462	93,045	16,223	209,486	465,938	56.8	353,707	294,753	241,590	168,226	256,475
Minneapolis & St. Louis	July	1,579	784,865	14,385	837,600	114,567	125,267	36,682	297,799	611,883	73.1	225,717	177,374	132,295	—69,540	160,185
	7 mos.	1,598	4,708,547	83,543	5,040,488	626,952	852,514	248,477	2,107,560	4,093,169	81.2	947,319	653,920	332,828	—316,207	533,827
Minneapolis, St. Paul & S. Ste. Marie	July	4,296	2,063,127	176,752	2,443,636	314,201	385,170	68,543	890,148	1,798,806	73.6	644,830	467,946	310,236	171,743	411,716
	7 mos.	4,296	12,783,741	708,046	14,651,627	2,069,383	2,592,010	421,794	6,139,322	12,016,380	82.0	2,635,247	1,519,599	612,304	—325,209	1,325,969
Duluth, South Shore & Atlantic	July	550	264,057	15,974	311,542	55,142	37,646	4,921	91,598	194,065	62.3	117,477	104,153	92,216	67,568	99,891
	7 mos.	550	1,424,304	78,500	1,644,850	236,669	246,538	30,320	593,328	1,142,191	69.4	502,659	424,201	365,322	212,025	419,573
Spokane International	July	163	70,496	1,582	77,882	22,133	6,281	2,102	21,452	56,366	72.4	21,516	16,387	12,669	4,585	14,302
	7 mos.	163	366,905	10,097	415,777	91,692	43,968	13,102	145,253	323,660	78.0	92,117	59,405	33,570	—29,125	43,872
Mississippi Central	July	150	79,628	1,628	83,564	14,537	10,399	6,919	20,018	57,051	68.3	26,513	22,685	18,503	1,562	20,751
	7 mos.	150	487,932	9,018	512,627	79,840	78,566	48,017	139,915	382,961	74.7	129,666	104,487	80,060	12,193	95,772
Missouri-Arkansas	July	364	85,023	1,704	92,169	22,776	9,985	5,356	27,219	70,637	76.6	21,532	18,404	10,359	12,161	11,191
	7 mos.	364	536,847	8,702	586,498	131,794	70,286	31,770	195,434	461,709	78.7	124,789	106,338	47,662	37,507	53,499
Missouri-Illinois	July	208	105,899	674	108,384	23,656	12,109	2,728	33,402	77,107	71.7	31,277	24,650	11,290	—1,615	14,574
	7 mos.	208	612,884	4,235	628,955	134,311	84,980	17,362	208,466	478,925	76.1	150,030	108,389	40,391	34,538	64,770
Missouri-Kansas-Texas Line	July	3,293	2,425,160	249,475	2,890,846	374,237	513,450	121,569	892,300	2,048,599	70.9	842,247	658,153	460,906	98,185	567,991
	7 mos.	3,293	14,538,924	1,274,035	17,399,247	2,238,554	3,311,156	821,983	6,127,269	13,499,403	77.6	3,899,844	2,679,492	1,236,994	—476,977	1,986,550
Missouri Pacific	July	7,228	7,337,049	524,184	8,467,008	1,167,580	1,405,714	280,168	2,617,681	5,774,421	68.2	2,692,587	2,242,576	1,707,905	331,613	2,057,427
	7 mos.	7,228	42,990,278	2,772,212	49,888,564	6,618,569	9,891,255	1,687,820	18,011,409	38,314,870	76.8	11,573,694	8,562,462	5,157,370	1,824,258	7,608,082
Gulf Coast Lines	July	1,763	648,978	37,840	735,454	159,239	178,126	49,446	296,973	730,320	99.30	5,134	61,207	117,377	70,281	83,603
	7 mos.	1,763	6,616,898	235,167	7,229,102	1,121,381	1,294,489	308,674	2,259,383	5,316,331	73.54	1,912,771	1,468,282	660,869	360,212	900,031

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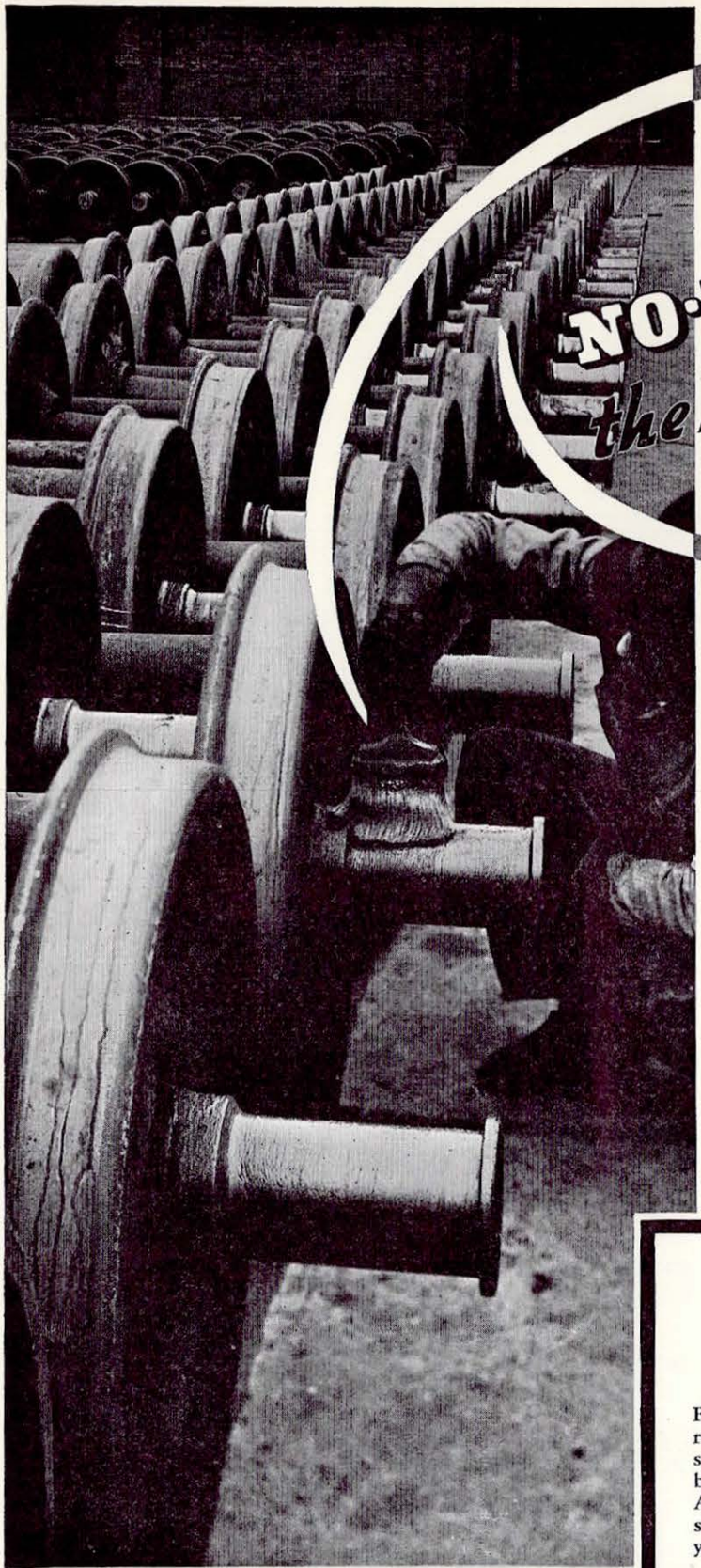

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GULF OIL CORPORATION ★ GULF REFINING COMPANY

GENERAL OFFICES—GULF BUILDING, PITTSBURGH, PA.

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After dep. & retir. 1936	1935	Before depr. & ret.
International Great Northern	July	1,154	$780,567	$100,100	$972,850	$143,770	$203,383	$34,214	$422,351	$859,821	88.38	$113,029	$58,461	—$29,654	$42,284	$2,557
	7 mos.	1,154	5,609,143	477,150	6,759,882	989,208	1,369,881	213,321	2,837,535	5,792,758	85.69	967,124	612,139	—59,591	321,300	154,572
Mobile & Ohio	July	1,201	839,748	41,034	923,833	108,213	197,097	44,103	306,257	697,092	75.5	226,741	178,204	129,329	45,094	180,630
	7 mos.	1,201	5,323,669	190,466	5,832,823	726,259	1,289,161	286,731	2,145,821	4,732,787	81.1	1,100,036	769,480	394,811	—134,094	754,037
Monongahela	July	171	350,234	1,114	353,476	45,048	27,132	407	69,295	144,908	41.0	208,568	185,679	109,298	53,438	114,745
	7 mos.	173	2,636,411	6,488	2,657,278	258,148	203,802	2,981	558,193	1,046,272	39.4	1,611,006	1,457,211	883,493	698,530	923,596
Montour	July	57	233,975	.....	235,429	17,588	44,994	1,049	46,204	116,455	49.5	118,974	93,279	108,371	63,452	119,409
	7 mos.	57	1,236,646	129	1,244,966	100,876	292,080	6,614	296,656	746,986	60.0	497,980	371,561	489,478	474,232	566,290
Nashville, Chattanooga & St. Louis	July	1,154	1,009,408	96,139	1,205,744	167,676	293,989	58,002	441,528	1,023,357	84.9	182,387	137,261	137,144	71,506	181,537
	7 mos.	1,154	6,371,567	636,023	7,856,670	1,034,820	1,902,731	428,946	3,131,634	6,950,803	88.5	905,867	588,278	521,358	253,470	832,127
Nevada Northern	July	165	32,744	509	37,297	8,080	4,973	896	8,013	25,875	69.3	11,422	4,671	7,494	2,626	13,457
	7 mos.	165	270,789	8,485	312,282	57,334	24,892	6,056	64,717	180,405	57.8	131,877	77,082	96,774	17,376	138,412
New York Central	July	11,214	20,826,804	5,494,166	29,416,616	3,124,639	5,943,022	609,061	10,519,536	21,676,132	73.7	7,740,484	5,514,446	4,255,844	1,765,347	5,607,772
	7 mos.	11,214	143,614,314	35,090,232	201,032,622	19,969,249	43,131,699	3,772,707	74,997,948	152,100,961	75.7	48,931,661	33,912,011	23,944,396	16,805,021	33,387,555
Pittsburgh & Lake Erie	July	233	1,930,285	65,380	2,042,346	229,488	516,360	29,166	561,631	1,418,567	69.5	623,779	442,027	604,636	389,558	755,178
	7 mos.	233	10,937,420	404,851	11,642,338	1,110,074	3,499,661	185,088	3,709,597	9,085,905	78.0	2,556,433	1,576,452	2,780,672	2,099,974	3,833,670
New York, Chicago & St. Louis	July	1,704	3,288,498	105,897	3,511,874	398,004	505,093	110,646	1,094,870	2,240,366	63.8	1,271,508	1,009,130	732,471	208,500	860,852
	7 mos.	1,704	21,791,641	535,084	23,112,518	2,192,242	3,337,617	793,754	7,708,601	14,937,256	64.6	8,175,262	4,889,917	3,232,371	5,791,410	4,182,696
New York, New Haven & Hartford	July	2,033	3,695,675	2,095,318	6,450,851	890,694	1,097,255	122,918	2,426,627	4,931,245	76.4	1,519,606	1,039,606	440,746	636,670	728,412
	7 mos.	2,050	25,284,169	13,707,971	44,009,292	6,068,792	7,756,007	690,720	17,001,205	34,310,645	78.0	9,698,647	6,468,647	2,504,158	4,880,499	4,512,829
New York Connecting	July	20	228,086	.....	235,497	14,079	10,830	.....	30,141	56,127	23.8	179,370	144,330	122,578	64,915	122,578
	7 mos.	20	1,553,547	.....	1,631,985	78,304	55,144	.....	233,189	375,785	23.0	1,256,200	1,012,710	792,003	736,142	792,003
New York, Ontario & Western	July	566	663,924	172,737	889,427	99,314	139,778	11,068	310,722	584,874	65.8	304,553	254,609	212,315	92,595	237,008
	7 mos.	566	4,667,347	248,862	5,289,364	538,984	969,519	81,254	2,200,999	3,972,763	75.1	1,316,601	997,239	747,811	769,462	921,244
Norfolk & Western	July	2,166	7,314,664	219,463	7,732,181	1,050,956	1,173,226	125,918	1,634,601	4,154,598	53.7	3,577,583	2,240,421	2,458,953	1,902,001	2,835,201
	7 mos.	2,166	47,774,560	1,199,176	50,539,270	6,116,440	7,828,751	874,791	11,320,448	27,554,503	54.5	22,984,767	15,855,038	17,615,101	12,728,379	20,240,215
Norfolk Southern	July	834	349,009	11,746	375,276	72,111	50,091	22,515	147,608	310,378	82.7	64,898	32,956	11,931	9,382	23,042
	7 mos.	834	2,421,108	50,439	2,584,471	474,273	348,586	157,012	974,586	2,093,037	81.0	491,434	288,303	167,897	243,673	245,180
Northern Pacific	July	6,727	4,390,062	562,522	5,569,212	848,393	1,096,982	181,135	1,939,139	4,464,983	80.2	1,104,229	516,545	801,312	176,088	1,082,533
	7 mos.	6,727	26,276,534	2,367,211	31,773,706	4,264,712	7,472,539	1,139,570	12,651,851	27,927,651	87.9	3,846,055	46,578	2,256,134	156,626	4,101,859
Northwestern Pacific	July	351	249,369	89,920	375,970	42,391	55,428	3,924	158,352	273,436	72.7	102,534	94,562	83,683	31,723	97,712
	7 mos.	351	1,315,594	513,461	2,029,049	298,482	368,448	28,565	1,045,731	1,837,277	90.5	191,772	114,206	69,034	—149,506	166,325
Oklahoma City-Ada-Atoka	July	132	46,552	510	49,570	7,576	2,018	802	11,175	23,619	47.6	25,951	21,529	15,774	2,968	15,781
	7 mos.	132	303,815	2,750	322,193	49,626	11,914	5,160	76,804	156,624	48.6	165,569	146,746	108,543	35,418	108,594
Pennsylvania	July	10,371	28,870,375	5,622,655	37,748,225	3,381,605	7,458,095	718,238	12,390,420	25,878,159	68.6	11,870,066	8,727,051	7,907,171	5,048,672	9,756,544
	7 mos.	10,422	182,381,998	38,260,299	242,716,391	21,806,884	49,668,708	4,428,767	86,071,495	175,214,693	72.2	67,501,698	48,835,279	43,088,165	38,447,263	55,768,214
Long Island	July	396	557,353	1,802,206	2,458,691	167,221	409,987	24,124	982,490	1,650,132	67.1	808,559	393,582	221,806	267,319	318,945
	7 mos.	396	3,792,450	10,081,587	14,514,256	1,088,229	2,574,067	126,489	6,766,990	11,020,067	75.9	3,494,189	1,765,457	666,975	360,779	1,346,297
Pennsylvania-Reading Seashore Lines	July	412	220,994	654,550	905,959	53,991	91,121	12,449	366,338	553,084	61.0	352,875	220,263	70,236	6,387	77,506
	7 mos.	412	1,755,171	1,543,359	3,446,289	422,566	527,054	78,014	1,954,334	3,178,089	92.2	268,200	—336,590	—938,375	—1,156,001	—887,384
Pere Marquette	July	2,115	2,259,312	117,047	2,551,311	312,280	564,814	69,863	896,146	1,949,634	76.4	601,677	386,902	327,667	145,710	541,600
	7 mos.	2,115	16,860,144	514,845	18,317,069	2,013,912	3,812,902	449,498	6,618,060	13,572,889	74.1	4,744,180	3,640,312	2,955,115	2,061,751	4,435,125
Pittsburg & Shawmut	July	103	34,769	117	35,460	9,095	14,515	1,112	12,366	39,894	112.5	—4,434	—5,475	—2,804	—2,827	3,001
	7 mos.	103	293,141	2,316	300,851	78,366	113,430	8,946	102,452	325,268	108.1	—24,417	—33,204	—16,604	53,381	24,068
Pittsburgh & West Virginia	July	138	326,259	.....	342,157	54,516	71,049	16,403	64,626	231,051	67.5	111,106	84,988	113,345	34,688	135,026
	7 mos.	138	2,035,937	.....	2,155,620	227,622	490,527	115,498	425,065	1,428,857	66.3	726,763	559,003	776,518	516,544	932,273
Pittsburg, Shawmut & Northern	July	190	89,412	22	90,815	18,222	18,179	1,316	30,016	74,062	81.5	16,753	14,449	8,057	—19,179	10,743
	7 mos.	190	583,143	349	593,447	124,678	118,192	9,640	219,466	518,457	87.4	74,990	59,261	18,150	7,512	36,942
Reading	July	1,456	4,119,452	305,750	4,608,304	325,752	744,006	74,732	1,732,036	3,105,809	67.4	1,502,495	1,056,493	1,093,158	657,174	1,356,528
	7 mos.	1,456	29,967,425	2,297,987	33,707,264	2,459,293	5,766,994	522,767	13,001,064	23,365,847	69.3	10,341,417	7,502,107	7,703,270	6,808,392	9,562,211
Richmond, Fredericksburg & Potomac	July	117	339,145	158,995	585,985	58,003	120,799	8,823	217,818	442,883	75.6	143,102	97,800	66,585	—18,270	93,457
	7 mos.	117	2,269,357	1,315,256	4,460,873	424,245	877,646	64,061	1,801,080	3,494,712	78.3	966,161	687,803	355,357	286,307	544,213
Rutland	July	407	211,109	32,801	307,322	46,436	55,042	11,076	138,213	265,427	86.4	41,895	28,441	27,267	—17,443	38,715
	7 mos.	407	1,338,099	207,604	1,940,125	316,332	381,543	73,364	977,812	1,849,900	95.3	90,225	—179	—918	—112,047	79,837
St. Louis-San Francisco	July	4,928	3,582,497	317,762	4,230,423	617,131	960,260	117,927	1,420,011	3,294,571	77.9	935,852	608,182	616,816	290,768	882,933
	7 mos.	4,928	22,037,580	1,825,469	26,177,808	3,871,033	6,375,700	792,343	9,638,479	21,912,858	83.7	4,264,950	2,213,288	2,304,339	116,547	4,185,646

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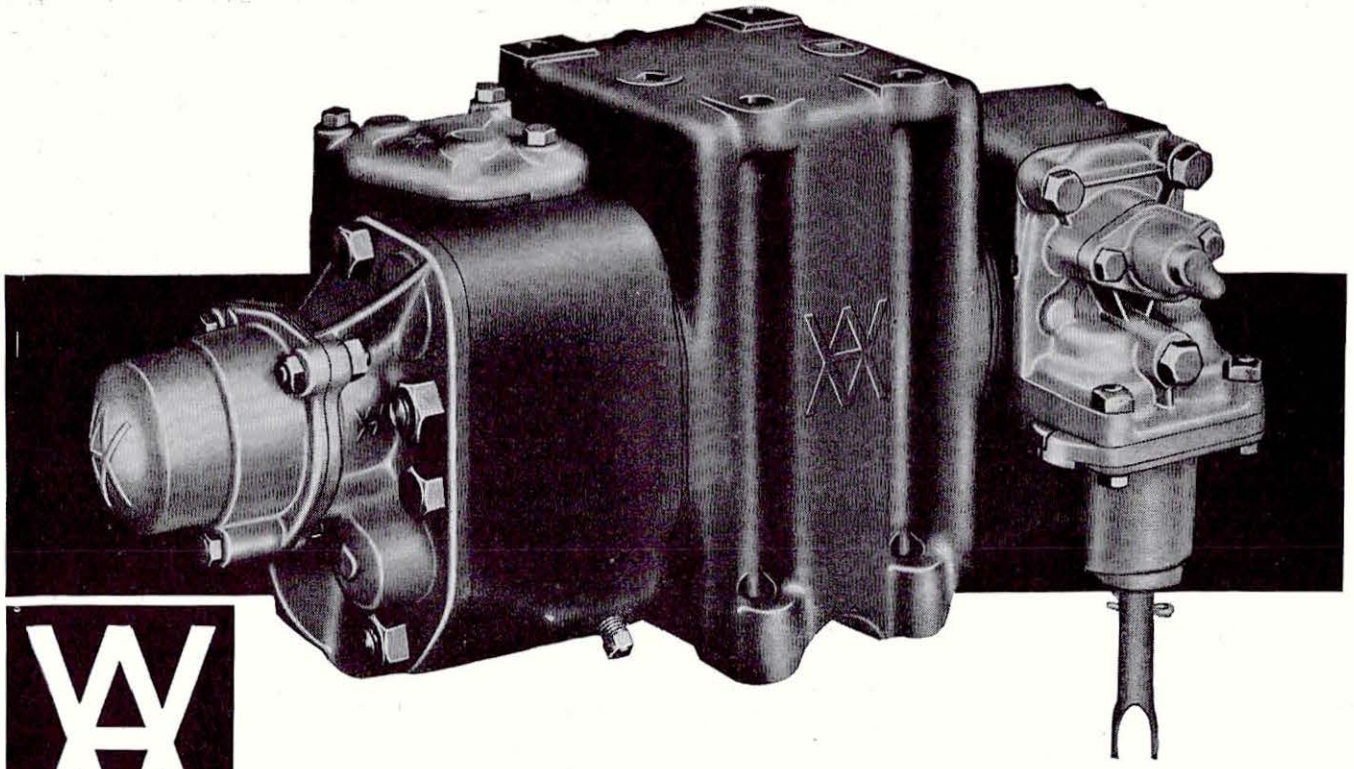

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WESTINGHOUSE AIR BRAKE CO.

GENERAL OFFICE AND WORKS . . . WILMERDING, PA.

Revenues and Expenses of Railways

MONTH OF JULY AND SEVEN MONTHS OF CALENDAR YEAR 1936—CONTINUED

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Operating income	Net railway operating income: After dep.& retir. 1936	After dep.& retir. 1935	Before depr.& ret.
Fort Worth & Rio Grande	July	233	$32,225	$1,736	$40,482	$12,740	$7,956	$2,296	$20,885	$46,577	115.1	—$6,095	—$10,251	—$17,432	—$24,138	—$17,382
	7 mos.	233	219,740	6,221	273,732	100,226	56,678	15,411	161,369	354,132	129.4	—80,400	—110,070	—161,671	—168,797	—161,316
St. Louis, San Francisco & Texas	July	261	146,995	1,210	151,869	32,369	13,886	5,273	49,112	107,324	70.7	44,545	37,445	3,420	—45,193	3,521
	7 mos.	261	706,863	4,821	739,226	270,166	96,826	38,894	322,230	774,904	104.8	—35,678	—76,763	—302,167	—326,140	—301,200
St. Louis Southwestern Lines	July	1,749	1,494,931	35,045	1,590,623	238,018	257,387	77,915	495,647	1,141,295	71.8	449,328	348,961	132,739	161,493	182,988
	7 mos.	1,779	10,283,151	138,662	10,818,522	1,258,361	1,697,816	531,453	3,351,386	7,331,252	67.8	3,487,270	2,852,748	1,702,251	1,401,087	2,055,837
Seaboard Air Line	July	4,307	2,173,414	292,754	2,689,465	459,696	665,612	147,663	1,084,330	2,522,226	93.8	167,239	22,239	17,572	—339,141	174,676
	7 mos.	4,307	16,891,042	2,816,924	21,920,208	3,139,609	4,639,873	1,058,892	8,380,865	18,539,376	84.6	3,380,832	1,875,832	1,179,525	1,350,926	2,275,791
Southern Railway	July	6,641	6,583,986	925,076	8,144,792	952,908	1,498,075	148,019	2,721,515	5,625,727	69.1	2,519,065	2,054,432	1,737,556	805,891	2,007,360
	7 mos.	6,641	43,187,037	5,375,201	53,155,143	6,622,964	9,807,132	1,044,970	18,946,581	38,526,893	72.5	14,628,250	11,505,274	9,496,799	6,257,546	11,390,485
Alabama Great Southern	July	315	459,017	63,084	559,117	94,559	131,244	12,166	163,734	422,087	75.5	137,030	97,418	71,513	40,243	94,903
	7 mos.	315	3,019,309	332,086	3,617,427	595,106	792,503	79,658	1,146,638	2,749,380	76.0	868,047	600,876	441,551	115,728	604,376
Cinn., New Orleans & Texas Pacific	July	336	1,436,332	99,647	1,607,015	170,859	288,418	26,072	351,496	882,877	54.9	724,138	593,246	548,541	370,126	598,486
	7 mos.	336	8,309,098	685,821	9,519,420	1,209,541	1,733,882	180,530	2,294,348	5,746,952	60.4	3,772,468	3,012,320	2,770,057	1,874,666	3,119,722
Georgia Southern & Florida	July	397	148,823	30,451	194,878	33,389	44,611	1,702	81,682	166,908	85.6	27,970	15,339	6,686	2,421	13,856
	7 mos.	397	885,011	314,114	1,340,113	219,894	276,093	13,109	600,862	1,160,268	86.6	179,845	92,081	25,869	12,202	75,388
New Orleans & Northeastern	July	204	196,168	22,788	235,043	26,062	36,227	5,495	69,473	148,323	63.1	86,720	62,785	39,500	17,541	45,669
	7 mos.	204	1,262,245	127,639	1,500,858	202,382	235,006	38,069	487,226	1,035,669	69.0	465,189	302,586	151,000	60,502	193,763
Northern Alabama	July	100	42,757	2,358	46,907	7,986	1,377	1,172	16,090	28,401	60.6	18,506	14,405	2,505	—11,221	2,575
	7 mos.	100	373,000	12,563	398,571	76,576	10,106	8,559	122,395	229,557	57.6	169,014	141,073	58,817	—1,277	59,309
Southern Pacific	July	8,772	10,408,349	2,189,060	13,531,982	1,273,856	2,118,579	336,833	5,054,588	9,662,264	71.4	3,869,718	3,093,199	2,301,906	1,546,580	2,772,278
	7 mos.	8,772	63,534,109	11,865,804	81,672,037	8,197,725	14,230,329	2,175,175	30,446,571	60,681,400	74.3	20,990,637	14,909,399	10,678,233	7,695,342	14,038,905
Southern Pacific Steamship Lines	July	....	439,152	31,671	487,377	26,209	89,376	16,669	356,582	507,321	104.1	—19,944	—19,097	—19,349	—61,112	16,019
	7 mos.	....	2,974,019	125,495	3,220,186	122,143	625,825	119,112	2,317,819	3,318,209	103.0	—98,023	—134,091	—135,853	—368,698	111,607
Texas & New Orleans	July	4,430	2,511,253	347,628	3,130,037	509,808	676,369	115,330	1,152,871	2,682,933	85.7	447,104	249,162	92,444	—92,906	232,244
	7 mos.	4,430	18,827,234	1,885,050	22,494,207	3,193,111	4,515,635	848,716	7,795,698	17,930,755	79.7	4,563,452	2,895,441	1,637,491	723,921	2,618,807
Spokane, Portland & Seattle	July	946	639,054	75,859	767,295	107,844	79,079	9,973	267,210	496,762	64.7	270,533	201,429	138,935	144,285	155,431
	7 mos.	946	3,624,893	314,127	4,287,391	544,373	550,259	64,120	1,594,245	2,951,711	68.8	1,335,680	850,063	493,622	668,825	609,093
Tennessee Central	July	286	194,854	5,867	210,611	37,336	26,759	6,024	64,728	144,353	68.5	66,258	62,726	49,796	41,254	55,764
	7 mos.	286	1,254,426	37,838	1,370,577	233,816	200,032	39,322	458,432	998,855	72.9	371,722	323,982	239,135	215,379	280,969
Texas & Pacific	July	1,949	1,988,168	277,018	2,433,231	245,879	441,515	84,455	723,161	1,647,468	67.7	785,763	615,396	450,388	456,486	548,046
	7 mos.	1,949	12,722,940	1,425,757	15,373,168	1,713,020	2,794,699	529,303	4,705,767	10,686,129	69.5	4,687,039	3,718,785	2,840,172	2,408,221	3,521,360
Texas Mexican	July	162	72,063	423	83,932	16,310	15,199	3,804	35,262	77,725	92.6	6,207	3	—4,709	—202	—2,866
	7 mos.	162	688,160	3,146	761,011	126,797	106,158	23,607	245,294	551,935	72.5	209,076	167,569	122,834	150,126	135,705
Toledo, Peoria & Western	July	239	241,326	2	244,146	74,220	15,819	16,918	50,154	165,817	67.9	78,329	54,901	33,968	15,253	45,917
	7 mos.	239	1,371,169	57	1,389,277	366,904	90,379	116,938	328,904	972,105	70.0	417,172	326,068	200,636	58,885	282,211
Union Pacific System	July	9,828	10,960,854	1,770,007	13,830,645	1,691,033	2,550,491	334,414	4,235,532	9,719,130	70.3	4,111,515	2,956,094	2,196,338	698,789	2,774,450
	7 mos.	9,827	64,535,785	8,093,447	79,511,740	10,099,950	16,396,919	2,311,919	26,706,143	61,059,315	76.8	18,452,425	10,995,587	7,161,355	4,919,369	10,921,607
Utah	July	111	42,894	.....	43,045	12,441	19,665	435	11,174	47,338	110.0	—4,293	—1,772	2,516	—12,827	12,342
	7 mos.	111	560,041	.....	562,225	100,136	156,458	3,161	138,799	430,022	76.5	132,203	73,389	68,414	12,205	137,172
Virginian	July	619	1,290,077	4,599	1,346,036	111,653	255,028	18,588	223,309	635,302	47.2	710,734	610,734	671,267	557,766	765,011
	7 mos.	619	9,150,275	25,985	9,543,939	731,211	1,734,240	129,333	1,640,823	4,449,218	46.6	5,094,721	4,229,721	4,588,106	3,930,646	5,241,381
Wabash	July	2,447	3,646,182	230,616	4,126,919	528,278	810,222	145,982	1,435,441	3,087,537	74.8	1,039,382	824,445	522,874	231,952	700,008
	7 mos.	2,447	22,984,549	1,412,404	26,308,044	3,137,926	4,922,648	995,608	9,886,985	20,050,492	76.2	6,257,552	4,877,232	2,847,351	2,459,086	4,092,291
Ann Arbor	July	293	301,055	5,551	329,280	29,774	70,729	13,143	131,278	257,866	78.3	71,414	53,736	41,753	43,405	61,727
	7 mos.	293	2,152,515	22,198	2,249,020	202,779	505,703	83,634	966,875	1,847,699	82.2	401,321	281,342	198,589	272,150	339,321
Western Maryland	July	882	1,260,249	12,312	1,306,689	190,020	251,290	36,866	314,293	848,101	64.9	458,588	358,588	361,579	274,999	456,554
	7 mos.	882	8,862,427	51,697	9,152,052	1,165,849	1,990,814	258,039	2,314,278	6,083,259	66.5	3,068,793	2,398,793	2,470,848	2,259,265	3,136,038
Western Pacific	July	1,207	1,196,090	52,249	1,281,954	377,782	253,105	60,016	447,452	1,172,841	91.5	109,113	24,594	—75,558	—80,938	—23,151
	7 mos.	1,207	6,872,821	244,431	7,335,885	1,900,823	1,554,771	402,417	3,037,713	7,192,790	98.0	143,095	—412,337	—927,325	—258,169	—569,044
Wheeling & Lake Erie	July	511	1,326,140	2,727	1,433,151	206,740	266,604	30,233	399,938	932,120	65.0	501,031	352,424	429,529	149,815	496,643
	7 mos.	511	7,961,625	12,135	8,441,537	1,191,838	2,054,516	213,170	2,504,287	6,184,354	73.3	2,257,183	1,389,961	1,619,443	1,077,401	2,247,998
Wichita Falls & Southern	July	203	51,748	36	60,505	12,213	5,721	1,502	13,871	36,186	59.81	24,319	20,934	18,584	17,483	20,557
	7 mos.	203	267,890	788	312,153	61,285	41,560	11,295	97,978	234,134	75.01	78,019	55,672	40,917	39,122	54,584

Table of Freight Operating Statistics begins on next left-hand page

The 10 New Haven Streamline Locomotives

ALL new power on the New Haven is being FIREBAR equipped. Over 100 of their most active locomotives are now FIREBAR equipped and others are being equipped as they pass through for shopping

WAUGH FIREBAR BETTER FIRES

FIREBAR DIVISION
OF THE
WAUGH EQUIPMENT COMPANY

New York Chicago St. Louis

Canadian Waugh Equipment Company, Montreal, Que.

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of May,

Region, road, and year	Miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (*thousands*)	Car-miles: Per cent loaded	Ton-miles (*thousands*): Gross, excluding locomotives and tenders	Ton-miles (*thousands*): Net, revenue and non-revenue	Number of road locomotives on line: Serviceable: Not stored	Serviceable: Stored	Unserviceable	Per cent unserviceable
New England Region:												
Boston & Albany	1936	373	130,984	135,518	9,313	3,310	67.1	175,624	60,764	51	10	31	33.7
	1935	402	118,505	113,265	8,335	3,006	69.8	150,858	50,924	57	10	29	30.2
Boston & Maine	1936	1,972	279,346	313,811	30,825	9,897	69.0	541,526	203,366	123	6	163	55.8
	1935	1,986	268,222	301,005	27,179	9,370	71.1	493,864	188,529	122	4	160	55.9
N. Y., New Hav. & Hartf.	1936	2,035	356,389	437,941	19,325	12,063	65.3	670,790	249,810	181	8	98	35.8
	1935	2,045	337,151	408,873	19,290	11,045	65.9	591,979	211,236	171	20	112	37.0
Great Lakes Region:													
Delaware & Hudson	1936	831	233,553	317,146	37,580	8,079	64.1	506,057	239,195	117	129	41	14.3
	1935	835	203,196	277,177	32,036	7,067	63.7	433,776	199,815	108	136	28	10.3
Del., Lack. & Western	1936	983	379,032	421,443	57,394	12,440	66.0	735,311	287,227	149	1	91	37.8
	1935	992	337,024	377,383	47,808	11,141	65.8	649,111	255,838	118	49	83	33.2
Erie (incl. Chi. & Erie)	1936	2,298	680,624	721,558	39,369	29,448	65.3	1,763,615	663,063	214	45	215	45.4
	1935	2,305	624,187	651,740	38,878	25,908	64.9	1,532,725	570,350	218	89	170	35.6
Grand Trunk Western	1936	1,027	281,404	285,159	3,750	7,667	62.8	461,683	159,194	84	..	56	40.0
	1935	1,007	237,848	240,325	2,039	6,425	60.7	386,315	124,143	74	..	71	49.0
Lehigh Valley	1936	1,316	405,010	431,024	50,063	13,572	65.6	840,952	350,099	129	1	161	55.3
	1935	1,335	370,355	393,230	39,410	11,561	64.1	726,227	293,307	145	8	156	50.5
New York Central	1936	10,789	2,700,965	2,855,147	172,331	91,801	59.6	5,901,171	2,349,503	831	105	605	39.3
	1935	10,919	2,328,473	2,448,273	151,424	78,168	61.7	4,875,273	1,960,641	733	154	622	41.2
N. Y., Chi. & St. Louis	1936	1,672	474,787	480,613	6,149	16,866	65.0	990,213	359,202	139	24	31	16.0
	1935	1,661	407,607	411,013	4,311	13,890	64.0	804,826	283,817	121	56	14	7.3
Pere Marquette	1936	2,081	381,084	395,757	5,967	10,103	61.4	633,764	229,730	120	3	35	22.2
	1935	2,096	326,424	346,039	2,639	8,047	61.0	503,228	178,578	108	6	44	27.8
Pittsburgh & Lake Erie	1936	234	79,099	82,359	34	3,214	62.6	269,539	154,102	28	18	25	35.2
	1935	234	63,546	65,485	17	2,549	59.1	216,679	120,953	24	10	37	52.1
Wabash	1936	2,435	571,619	578,542	11,811	17,833	63.9	1,044,821	352,275	131	32	147	47.4
	1935	2,435	535,331	541,705	11,044	16,369	63.2	940,667	301,062	132	32	170	50.9
Central Eastern Region:													
Baltimore & Ohio	1936	6,366	1,505,155	1,846,923	181,669	47,279	63.1	3,187,258	1,433,900	646	28	635	48.5
	1935	6,321	1,268,121	1,517,275	155,641	37,573	62.9	2,496,006	1,111,780	600	140	576	43.8
Central of New Jersey	1936	681	147,296	166,517	32,016	4,918	61.4	329,462	153,187	39	28	88	56.8
	1935	684	139,077	156,919	28,281	4,660	59.7	319,782	151,579	56	15	86	54.8
Chicago & Eastern Illinois	1936	931	169,822	170,334	2,607	4,152	67.5	244,155	99,828	56	3	51	46.4
	1935	939	157,414	157,617	2,369	3,479	63.4	217,299	87,298	44	5	66	55.0
Elgin, Joliet & Eastern	1936	434	94,017	95,563	1,761	2,488	62.8	182,517	91,140	58	..	28	32.6
	1935	446	84,585	87,789	546	1,956	60.6	149,146	72,131	51	3	32	37.2
Long Island	1936	393	29,530	30,027	15,948	287	51.0	22,148	8,569	29	5	17	33.3
	1935	393	29,241	29,930	15,739	296	52.9	22,467	9,059	31	..	21	40.4
Pennsylvania System	1936	9,801	2,968,534	3,376,643	365,210	105,030	61.7	7,096,896	3,089,492	1,354	166	879	36.6
	1935	10,009	2,519,399	2,815,672	292,869	88,139	63.4	5,777,585	2,525,353	1,224	242	973	39.9
Reading	1936	1,449	417,487	458,727	58,314	12,092	61.1	861,118	405,444	203	56	92	26.2
	1935	1,452	372,530	406,713	45,951	10,510	60.4	751,402	351,976	178	91	99	26.9
Pocahontas Region:													
Chesapeake & Ohio	1936	3,050	852,121	894,730	38,118	39,995	55.8	3,361,275	1,811,329	382	62	88	16.5
	1935	3,050	754,180	785,205	29,623	31,913	55.6	2,666,895	1,423,241	351	125	86	15.3
Norfolk & Western	1936	2,145	627,895	663,852	31,625	25,977	59.0	2,152,397	1,134,395	231	104	35	9.5
	1935	2,145	564,774	585,973	24,244	22,313	58.5	1,819,909	939,124	220	132	34	8.8
Southern Region:													
Atlantic Coast Line	1936	5,100	615,146	615,509	7,993	12,895	62.2	701,777	239,215	223	51	122	30.8
	1935	5,148	599,593	601,406	8,058	12,004	61.9	638,898	212,643	264	46	137	30.6
Central of Georgia	1936	1,886	248,019	251,807	3,715	5,395	72.8	292,789	112,220	102	..	27	20.9
	1935	1,886	224,637	225,702	3,324	4,877	68.8	267,240	102,767	102	..	40	28.4
Illinois Central (incl. Y. & M. V.)	1936	6,562	1,596,850	1,611,596	29,907	38,159	63.2	2,360,167	921,000	632	15	212	24.7
	1935	6,587	1,446,628	1,461,203	27,770	33,507	62.0	2,067,646	793,298	619	5	302	32.6
Louisville & Nashville	1936	4,998	1,145,339	1,249,361	32,272	27,557	58.7	1,936,569	881,661	348	5	214	37.7
	1935	5,046	994,785	1,079,233	24,874	22,367	60.3	1,523,461	695,135	307	15	260	44.7
Seaboard Air Line	1936	4,295	494,202	512,260	4,105	12,656	64.8	722,165	249,995	218	7	101	31.0
	1935	4,295	483,268	488,780	3,934	10,928	64.3	631,000	213,501	220	12	121	34.3
Southern	1936	6,596	1,205,692	1,224,074	19,981	28,080	68.0	1,520,412	582,267	477	33	290	36.3
	1935	6,599	1,084,940	1,098,736	17,391	24,003	67.2	1,294,828	485,038	399	91	354	41.9
Northwestern Region:													
Chi. & North Western	1936	8,355	1,007,510	1,052,414	26,543	26,504	65.2	1,604,214	609,021	336	122	247	35.0
	1935	8,428	886,800	932,756	24,707	22,668	65.4	1,348,412	465,032	422	86	258	33.7
Chicago Great Western	1936	1,458	240,672	241,226	6,818	7,492	60.5	461,852	162,494	57	2	29	33.0
	1935	1,456	221,578	221,682	7,198	6,386	62.0	384,463	135,246	59	4	37	37.0
Chi., Milw., St. P. & Pac.	1936	11,121	1,314,996	1,398,010	57,664	36,381	62.5	2,292,751	912,388	457	96	132	19.3
	1935	11,118	1,164,627	1,221,261	52,623	29,962	60.8	1,878,412	732,153	371	102	197	29.4
Chi., St. P., Minneap. & Om.	1936	1,637	210,257	218,841	9,365	4,756	67.8	283,338	116,226	87	31	30	20.3
	1935	1,644	189,706	195,940	8,248	3,891	68.8	222,059	89,279	59	48	38	26.2
Great Northern	1936	8,155	742,751	739,850	26,306	26,551	62.4	1,783,521	816,625	343	52	189	32.4
	1935	8,041	651,600	656,263	19,016	20,848	63.1	1,370,508	617,895	329	87	187	31.0
Minneap., St. P. & S. St. M.	1936	4,273	376,423	383,475	3,649	8,864	66.6	522,121	219,615	125	..	30	19.4
	1935	4,274	362,796	366,413	2,275	7,491	67.5	415,964	172,399	122	..	40	24.7
Northern Pacific	1936	6,429	622,116	684,112	47,054	19,287	65.6	1,148,194	469,345	338	24	79	17.9
	1935	6,416	530,403	582,867	37,491	15,914	67.9	926,846	382,304	330	14	112	24.6
Central Western Region:													
Alton	1936	928	197,533	204,230	1,499	4,484	63.2	283,391	99,687	69	3	25	25.8
	1935	921	190,650	195,181	1,431	3,907	58.8	253,821	86,058	64	1	34	34.3
Atch., Top. & S. Fe (incl. G.C. & S.F. & P. & S.F.)	1936	13,235	1,711,186	1,851,401	82,522	47,687	63.2	2,937,861	985,192	529	100	346	35.5
	1935	13,308	1,619,573	1,696,717	62,956	42,862	63.0	2,589,331	847,718	489	138	369	37.0
Chicago, Burl. & Quincy	1936	8,969	1,210,042	1,265,887	47,343	32,221	64.7	1,868,666	773,828	427	4	107	19.9
	1935	8,971	1,096,395	1,132,208	38,710	26,515	62.0	1,548,001	629,237	452	18	96	17.0
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)	1936	8,176	1,186,728	1,206,830	6,004	25,386	60.5	1,582,399	567,279	403	2	312	43.5
	1935	8,272	1,028,549	1,035,189	5,656	21,750	61.5	1,309,214	461,279	348	17	360	49.7
Denv. & Rio Gr. Western	1936	2,584	324,969	355,436	34,472	8,466	66.4	515,756	200,301	166	9	31	15.0
	1935	2,584	232,485	249,209	23,047	6,027	68.4	345,866	139,831	154	18	49	22.2
Southern Pac.—Pac. Lines.	1936	8,596	1,407,824	1,535,640	184,589	45,669	60.4	2,925,074	926,062	372	168	238	30.6
	1935	8,599	1,177,817	1,271,514	138,641	40,331	60.8	2,596,492	816,384	388	137	259	33.1
Union Pacific†	1936	9,824	1,610,629	1,673,053	104,141	53,764	66.6	3,179,589	1,127,281	565	69	228	26.5
	1935	9,832	1,555,790	1,615,393	90,034	47,530	64.8	2,783,148	985,725	566	82	253	28.1
Southwestern Region:													
Mo.-Kans.-Texas Lines	1936	3,282	378,237	383,955	6,177	10,159	60.1	630,380	218,132	100	24	79	38.9
	1935	3,282	341,706	344,058	5,264	8,704	58.7	534,364	175,630	81	26	87	44.8
Missouri Pacific	1936	7,201	1,157,401	1,197,324	26,591	33,413	62.9	2,090,657	773,365	316	97	128	23.7
	1935	7,208	1,084,663	1,110,166	22,869	28,007	63.2	1,690,844	622,630	265	124	171	30.5
St. Louis-San Francisco	1936	4,888	718,040	724,059	10,742	15,054	62.2	935,099	359,760	269	91	63	14.9
	1935	4,993	647,518	657,351	8,236	13,314	61.5	811,961	310,302	269	120	67	14.7
St. Louis Southw. Lines	1936	1,768	270,205	273,576	3,517	7,806	60.8	470,998	154,909	101	11	8	6.7
	1935	1,774	270,979	277,673	3,572	6,726	58.2	412,835	126,745	104	6	10	8.3
Texas & New Orleans	1936	4,416	561,439	561,563	6,413	13,317	62.6	825,200	289,744	193	44	59	19.9
	1935	4,429	518,723	519,451	7,674	11,895	64.7	713,722	250,416	186	59	58	19.1
Texas & Pacific	1936	1,945	299,252	299,252	1,584	9,112	60.9	563,355	184,244	65	51	101	46.5
	1935	1,945	257,347	257,347	1,508	7,401	62.1	450,582	149,500	77	76	68	30.8

NOTE: Effective with carrier reports for the month of January, 1936, the rules relative to operating statistics of large steam railways were revised with the following effect on this statement: Miles of road operated, number of locomotives on line, and number of freight cars on line were changed from averages for the month to actual figures as of the close of the month. Freight train and locomotive-miles, which formerly applied only to freight trains and the *freight proportion of mixed trains*, based on car-miles, were changed to apply to freight trains and all mixed trains handling more freight-train cars than passenger-train cars. Carriers were not required to rework 1935 figures according to the revised rules, but they have in some cases supplied considerable comparable data. In other cases, the figures shown in this statement for last year were restated by the carriers from last year's reports, or inserted from such reports by the Bureau of Statistics.

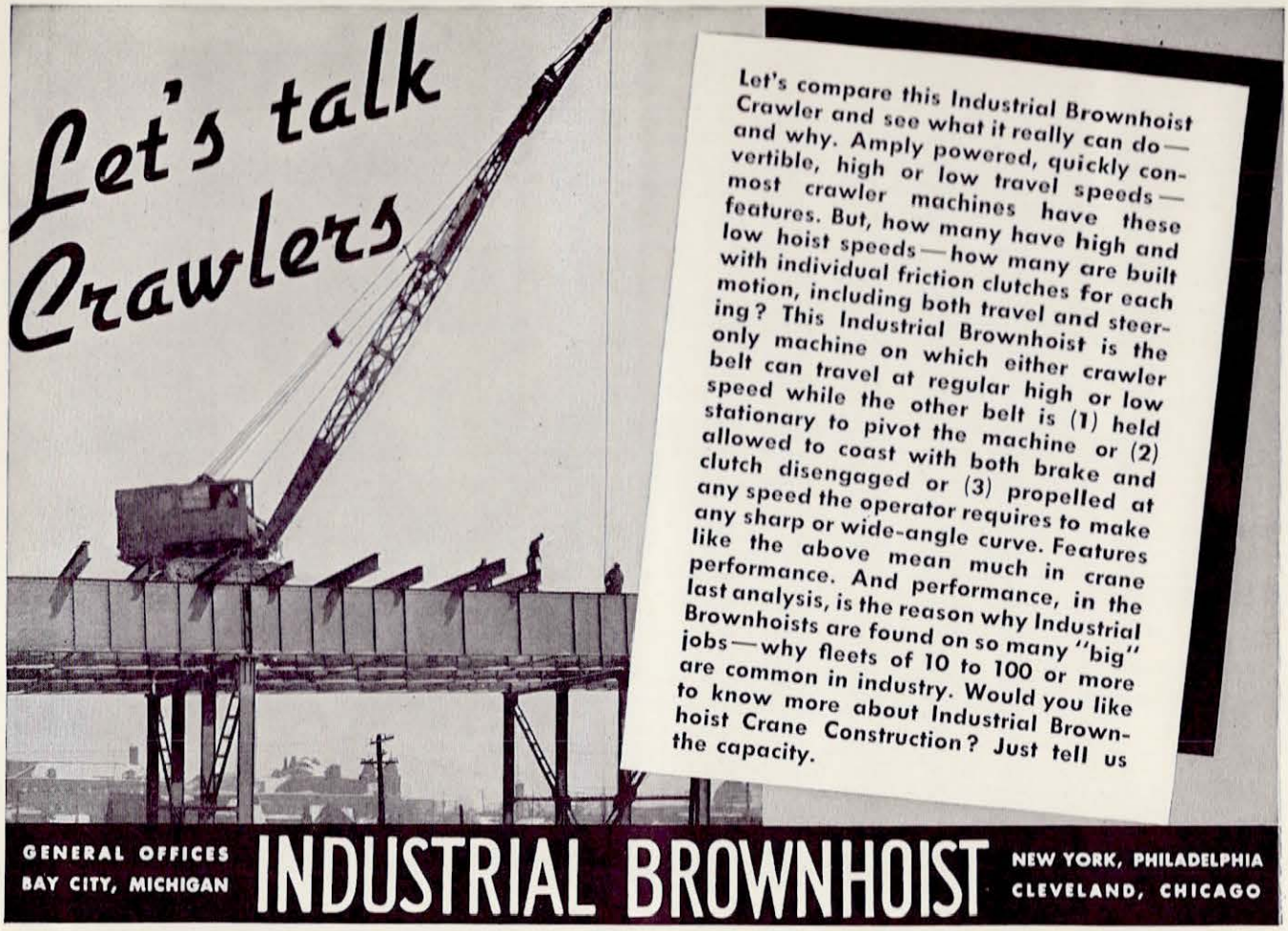
* Not available.

† Includes Los Angeles & Salt Lake, Oregon Short Line, Oregon-Washington R.R. & Navigation Co., and St. Joseph & Grand Island, leased January 1, 1936.

1936, Compared with May, 1935, for Roads with Annual Operating Revenues Above $25,000,000

Region, road, and year		Number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:														
Boston & Albany	1936	2,335	4,371	6,706	23.1	22,361	1,354	468	18.4	285	23.1	5,254	154	50.8
	1935	2,836	4,463	7,299	23.5	21,209	1,276	431	16.9	228	19.3	4,089	152	44.2
Boston & Maine	1936	8,322	7,779	16,101	15.7	26,010	1,947	731	20.5	404	28.5	3,327	101	38.3
	1935	8,480	8,441	16,921	14.5	25,884	1,850	706	20.1	370	25.8	3,062	102	37.2
N. Y., New Hav. & Hartf.	1936	13,081	11,084	24,165	17.5	27,108	1,924	717	20.7	323	23.9	3,961	102	50.8
	1935	14,768	9,853	24,621	15.9	25,465	1,781	636	19.1	277	22.0	3,332	106	45.6
Great Lakes Region:														
Delaware & Hudson	1936	8,950	3,464	12,414	6.5	30,694	2,180	1,030	29.6	628	33.0	9,288	105	40.0
	1935	10,499	2,522	13,021	5.3	29,909	2,147	989	28.3	475	26.3	7,716	111	36.7
Del., Lack. & Western	1936	13,755	5,944	19,699	16.7	32,234	1,966	768	23.1	465	30.5	9,429	127	63.8
	1935	16,519	4,420	20,939	12.5	31,710	1,946	767	23.0	390	25.8	8,321	132	54.0
Erie (incl. Chi. & Erie)	1936	16,595	17,850	34,445	4.4	42,833	2,606	980	22.5	609	41.4	9,310	95	51.7
	1935	23,374	10,631	34,005	7.5	41,256	2,470	919	22.0	530	37.1	7,982	95	46.5
Grand Trunk Western	1936	4,251	7,698	11,949	15.8	32,283	1,661	573	20.8	425	32.6	5,000	95	66.8
	1935	4,278	7,946	12,224	17.0	32,030	1,641	527	19.3	330	28.2	3,978	100	54.1
Lehigh Valley	1936	12,185	9,075	21,260	7.7	37,339	2,117	881	25.8	521	30.8	8,582	117	52.6
	1935	13,563	5,756	19,319	11.4	34,660	2,015	814	25.4	499	30.7	7,085	129	45.3
New York Central	1936	107,101	64,945	172,046	19.9	37,343	2,206	878	25.6	433	28.4	7,025	100	63.4
	1935	*	*	181,930	18.8	36,082	2,115	853	25.1	348	22.5	5,792	102	55.6
N. Y., Chi. & St. Louis	1936	6,509	7,843	14,352	4.0	38,364	2,089	758	21.3	817	59.0	6,931	87	80.9
	1935	8,686	5,840	14,526	4.7	36,841	1,977	697	20.4	635	48.5	5,513	90	70.1
Pere Marquette	1936	8,929	6,382	15,311	4.9	28,249	1,665	604	22.7	472	33.8	3,560	89	82.0
	1935	10,696	4,483	15,179	4.7	26,519	1,544	548	22.2	365	27.0	2,749	96	71.4
Pittsburgh & Lake Erie	1936	13,896	11,550	25,446	38.8	48,688	3,416	1,953	47.9	197	6.6	21,259	91	38.5
	1935	15,781	11,583	27,364	44.6	49,697	3,421	1,910	47.5	148	5.3	16,697	93	29.8
Wabash	1936	10,696	9,315	20,011	3.3	37,211	1,843	621	19.8	577	45.6	4,667	101	61.4
	1935	13,584	8,036	21,620	4.3	36,170	1,776	569	18.4	463	39.8	3,989	110	53.5
Central Eastern Region:														
Baltimore & Ohio	1936	68,282	27,293	95,575	16.0	28,752	2,146	965	30.3	484	25.3	7,266	134	50.0
	1935	78,328	20,431	98,759	18.2	26,761	1,991	887	29.6	363	19.5	5,674	143	41.0
Central of New Jersey	1936	11,120	9,675	20,795	32.7	27,453	2,335	1,086	31.1	230	12.0	7,254	140	41.3
	1935	12,544	9,475	22,019	28.5	29,430	2,366	1,122	32.5	229	11.8	7,149	140	38.1
Chicago & Eastern Illinois	1936	3,481	3,213	6,694	11.2	27,292	1,442	590	24.0	490	30.2	3,458	127	51.2
	1935	3,645	2,244	5,889	10.7	25,934	1,388	557	25.1	478	30.0	2,999	122	47.3
Elgin, Joliet & Eastern	1936	7,834	5,372	13,206	5.2	17,427	1,987	992	36.6	226	9.8	6,773	112	36.5
	1935	8,011	3,100	11,111	7.3	17,582	1,803	872	36.9	212	9.5	5,215	117	33.1
Long Island	1936	635	3,190	3,825	2.5	5,928	771	298	29.9	69	4.5	704	296	29.1
	1935	777	3,036	3,813	3.3	6,092	780	315	30.6	73	4.5	744	295	28.3
Pennsylvania System	1936	200,323	63,125	263,448	17.0	34,807	2,432	1,059	29.4	376	20.7	10,169	112	50.7
	1935	240,231	46,711	286,942	14.9	33,717	2,331	1,019	28.7	286	15.7	8,139	114	41.2
Reading	1936	25,482	10,849	36,331	11.2	25,233	2,068	974	33.5	358	17.5	9,026	139	47.9
	1935	31,774	7,223	38,997	7.9	26,007	2,024	948	33.5	286	14.1	7,820	145	39.6
Pocahontas Region:														
Chesapeake & Ohio	1936	41,881	14,175	56,056	1.8	57,326	3,993	2,152	45.3	1,087	41.0	19,159	70	56.7
	1935	41,709	10,794	52,503	1.9	50,873	3,566	1,903	44.6	867	34.9	15,052	73	46.6
Norfolk & Western	1936	31,311	5,181	36,492	3.2	50,895	3,448	1,817	43.7	1,037	40.2	17,061	96	60.3
	1935	34,811	4,157	38,968	2.2	48,276	3,242	1,673	42.1	796	32.3	14,120	100	51.5
Southern Region:														
Atlantic Coast Line	1936	20,751	7,939	28,690	23.9	20,374	1,149	392	18.6	268	23.2	1,513	113	49.8
	1935	23,232	7,442	30,674	17.3	19,137	1,073	357	17.7	227	20.7	1,333	111	44.4
Central of Georgia	1936	3,622	3,392	7,014	6.0	22,137	1,188	455	20.8	516	34.1	1,920	119	63.9
	1935	5,809	3,294	9,103	21.9	21,745	1,194	459	21.1	364	25.1	1,758	122	52.4
Illinois Central (incl. Y. & M. V.)	1936	37,276	19,241	56,517	29.0	25,990	1,488	580	24.1	521	34.2	4,527	123	61.3
	1935	43,405	15,615	59,020	34.4	25,723	1,442	553	23.7	430	29.3	3,885	128	51.8
Louisville & Nashville	1936	37,677	11,684	49,361	23.4	26,722	1,694	771	32.0	586	31.2	5,691	121	73.0
	1935	40,790	8,109	48,899	26.0	24,169	1,538	702	31.1	424	22.9	4,443	131	61.2
Seaboard Air Line	1936	9,989	4,506	14,495	2.9	24,923	1,487	515	19.8	534	41.6	1,878	112	50.8
	1935	10,611	3,881	14,492	4.3	22,417	1,327	449	19.5	445	35.3	1,603	115	45.3
Southern	1936	23,255	17,233	40,488	16.2	21,515	1,268	485	20.7	460	32.6	2,848	142	50.2
	1935	27,365	14,067	41,432	16.9	20,592	1,199	449	20.2	371	27.3	2,371	147	42.7
Northwestern Region:														
Chi. & North Western	1936	37,118	19,630	56,748	9.2	25,406	1,596	606	23.0	348	23.2	2,351	118	48.6
	1935	41,991	21,852	63,843	13.5	23,403	1,525	526	20.5	242	18.1	1,780	126	40.3
Chicago Great Western	1936	1,831	3,688	5,519	3.7	32,362	1,921	676	21.7	921	70.2	3,595	120	90.4
	1935	2,346	2,893	5,239	3.9	32,737	1,738	611	21.2	844	64.2	2,996	125	73.8
Chi., Milw., St. P. & Pac.	1936	43,902	20,158	64,060	3.1	27,730	1,750	697	25.1	470	30.0	2,647	115	68.6
	1935	50,511	14,569	65,080	2.8	25,927	1,620	631	24.4	363	24.4	2,124	121	61.3
Chi., St. P., Minneap. & Om.	1936	3,061	5,500	8,561	10.5	17,636	1,352	555	24.4	445	26.8	2,290	110	49.4
	1935	1,962	6,491	8,453	10.6	17,477	1,173	471	22.9	343	21.7	1,752	118	43.3
Great Northern	1936	36,967	10,171	47,138	11.0	36,050	2,422	1,109	30.8	559	29.1	3,230	102	41.7
	1935	41,867	8,613	50,480	9.9	33,062	2,116	954	29.6	397	21.2	2,479	115	36.1
Minneap., St. P. & S. St. M.	1936	12,184	4,370	16,554	5.8	22,016	1,393	586	24.8	429	26.0	1,658	97	80.1
	1935	13,627	3,709	17,336	4.6	18,409	1,151	477	23.0	324	20.8	1,301	107	73.9
Northern Pacific	1936	27,897	5,596	33,493	12.7	29,509	1,853	758	24.3	451	28.2	2,355	144	52.6
	1935	33,876	4,001	37,877	12.2	27,945	1,759	725	24.0	321	19.7	1,922	156	43.8
Central Western Region:														
Alton	1936	2,396	6,051	8,447	24.8	33,984	1,439	506	22.2	389	27.7	3,464	115	67.7
	1935	2,995	6,145	9,140	20.0	31,637	1,336	453	22.0	299	23.1	3,013	116	62.8
Atch., Top. & S. Fe (incl. G.C. & S.F. & P. & S.F.)	1936	67,741	13,066	80,807	11.4	32,442	1,720	577	20.7	395	30.3	2,401	118	63.1
	1935	74,315	9,592	83,907	12.9	30,450	1,602	524	19.8	323	26.0	2,055	124	57.0
Chicago, Burl. & Quincy	1936	27,392	14,187	41,579	9.4	27,582	1,551	642	24.0	601	38.7	2,783	117	78.6
	1935	32,768	11,009	43,777	9.2	25,296	1,418	576	23.7	461	31.3	2,263	124	66.7
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)	1936	24,852	12,360	37,212	10.9	24,004	1,337	479	22.3	493	36.5	2,238	131	54.5
	1935	30,780	10,671	41,451	16.6	22,632	1,276	450	21.2	359	27.5	1,799	141	46.1
Denv. & Rio Gr. Western	1936	12,889	3,002	15,891	7.2	26,527	1,592	618	23.7	406	25.8	2,500	156	61.1
	1935	13,379	2,725	16,104	4.8	23,377	1,492	603	23.2	281	17.7	1,746	158	39.7
Southern Pac.—Pac. Lines	1936	32,884	26,876	59,760	8.5	34,056	2,095	663	20.3	513	41.8	3,475	103	70.7
	1935	34,249	25,249	59,498	8.5	35,049	2,219	698	20.2	444	36.1	3,062	102	59.4
Union Pacific†	1936	41,284	15,863	57,147	14.4	41,860	1,986	704	21.0	633	45.2	3,702	116	66.0
	1935	43,746	13,648	57,394	19.2	37,714	1,800	637	20.7	624	48.0	3,241	115	61.2
Southwestern Region:														
Mo.-Kans.-Texas Lines	1936	4,739	5,126	9,865	6.5	31,812	1,668	577	21.5	712	55.2	2,144	83	62.0
	1935	5,689	3,211	8,900	3.6	28,813	1,565	514	20.2	635	53.6	1,726	88	58.1
Missouri Pacific	1936	16,497	19,076	35,573	3.7	33,340	1,813	671	23.1	710	48.8	3,464	111	72.7
	1935	19,019	15,032	34,051	4.4	29,037	1,567	577	22.2	577	41.1	2,787	123	65.2
St. Louis-San Francisco	1936	18,711	6,641	25,352	6.5	25,715	1,306	503	23.9	458	30.8	2,374	125	56.0
	1935	22,138	4,884	27,022	5.8	23,052	1,260	482	23.3	370	25.8	2,005	131	47.1
St. Louis Southw. Lines	1936	2,912	4,033	6,945	4.0	33,378	1,746	574	19.8	803	66.5	2,827	84	75.1
	1935	3,640	3,509	7,149	6.9	29,444	1,530	470	18.8	586	53.4	2,305	92	76.2
Texas & New Orleans	1936	7,465	11,964	19,429	7.7	26,500	1,480	520	21.8	484	35.5	2,117	87	61.9
	1935	7,326	11,431	18,757	7.8	25,329	1,387	487	21.1	436	32.0	1,824	91	56.1
Texas & Pacific	1936	2,879	4,783	7,662	3.6	31,900	1,888	618	20.2	757	61.5	3,055	85	44.5
	1935	2,819	4,192	7,011	5.4	29,036	1,758	583	20.2	675	53.9	2,479	87	37.8

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.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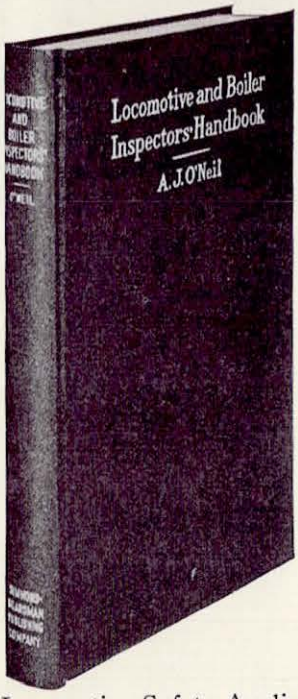

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Remember this resolution. You have all the power. You alone can oust political spendthrifts and put clear-headed lawmakers in their places.

ACT TODAY

Don't wait. You can stop tax wasting QUICKLY! Write these three letters. Mail them today:

One to your MAYOR (or the County Clerk, if you live in the country). One to your GOVERNOR. One to the PRESIDENT.

Write only one sentence in each letter and sign your name and address. Say: "I want the cost of government reduced!"

BUT DO IT TODAY! It's your job, Mr. and Mrs. Public. You alone can protect yourself. Don't fail. Let the wasteful spender know his game is up. Let's all help give America back to the people!

Write this letter today!

"I want the cost of Government REDUCED!"

MAIL COPIES OF IT TO:

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2 Your Governor

3 The President of the United States

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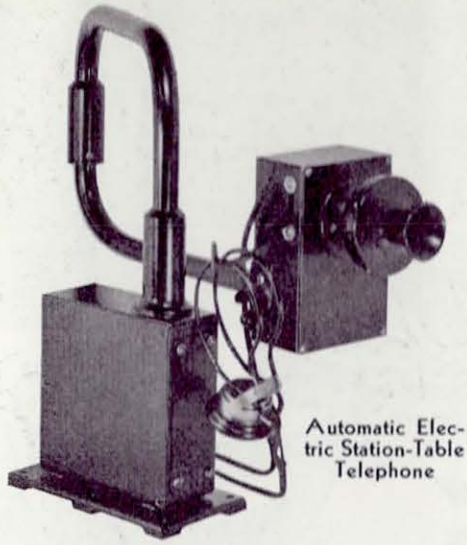

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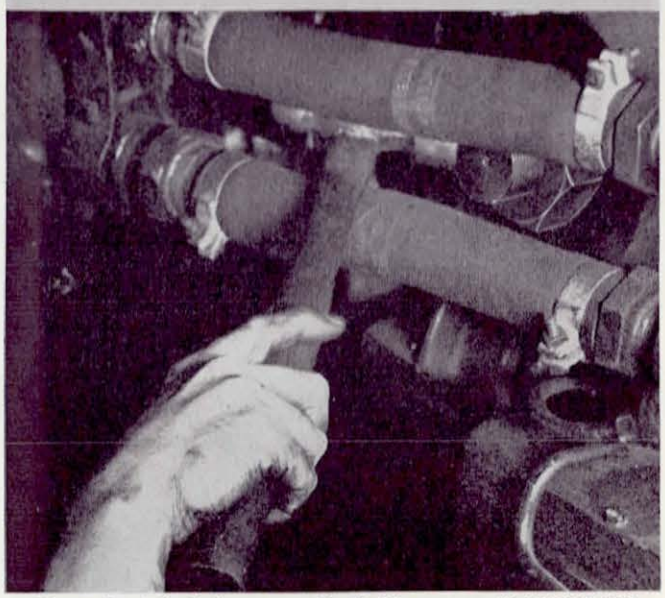

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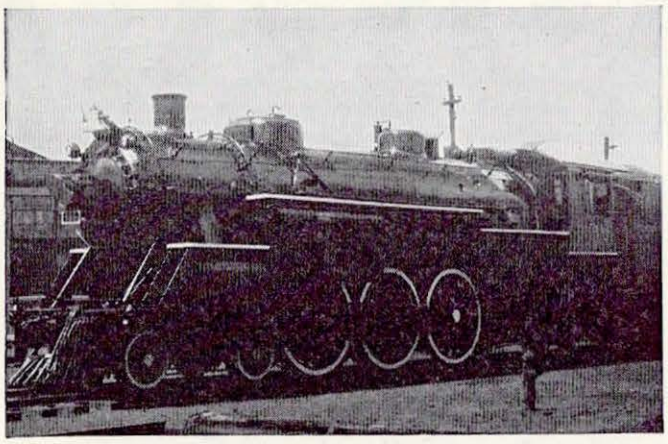

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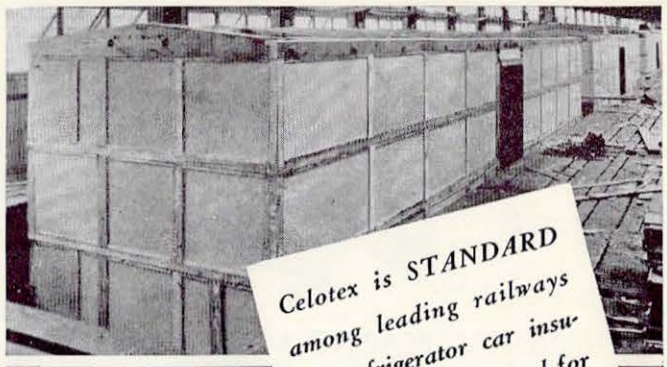

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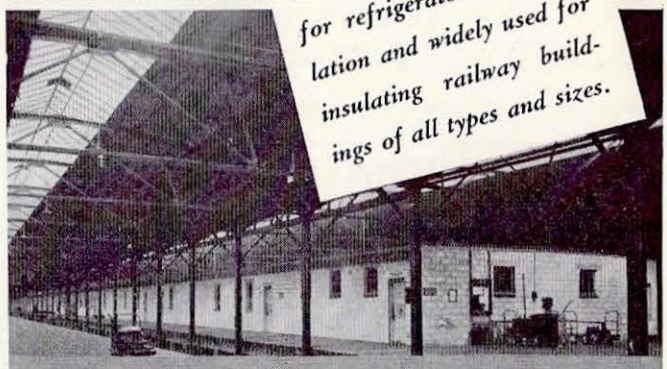

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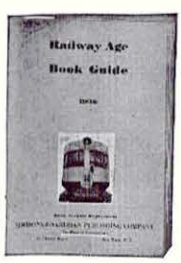

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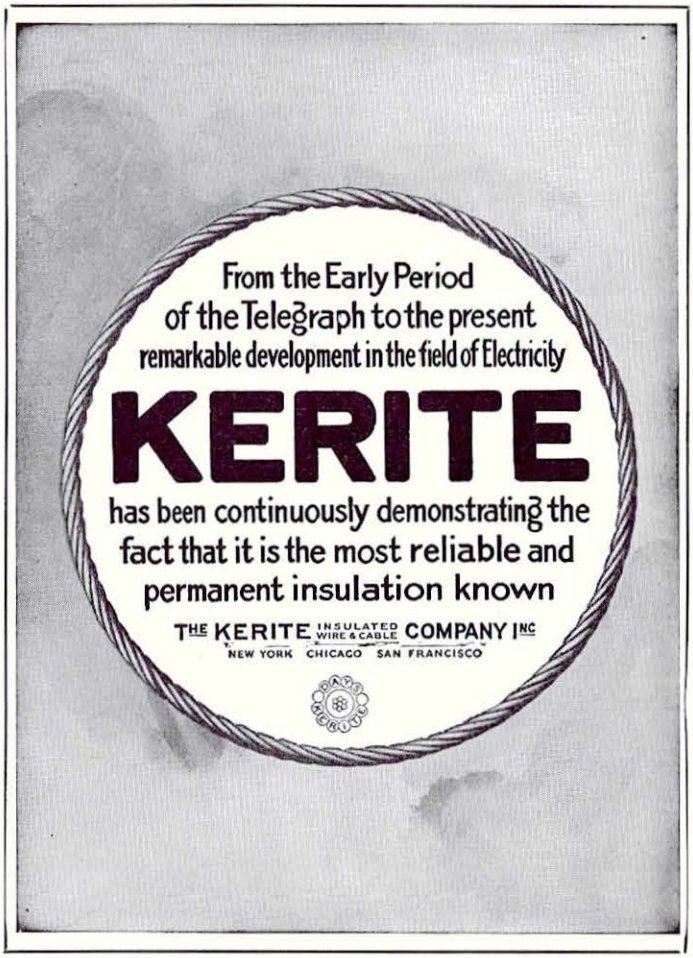
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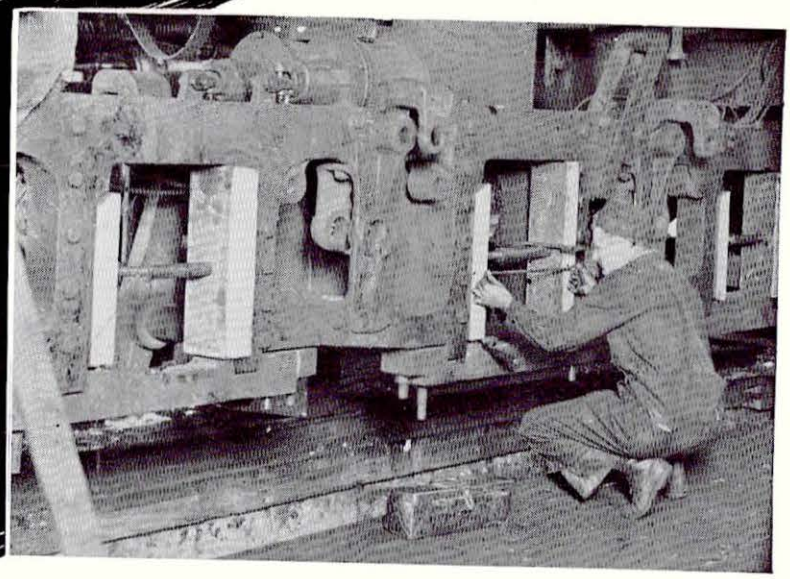

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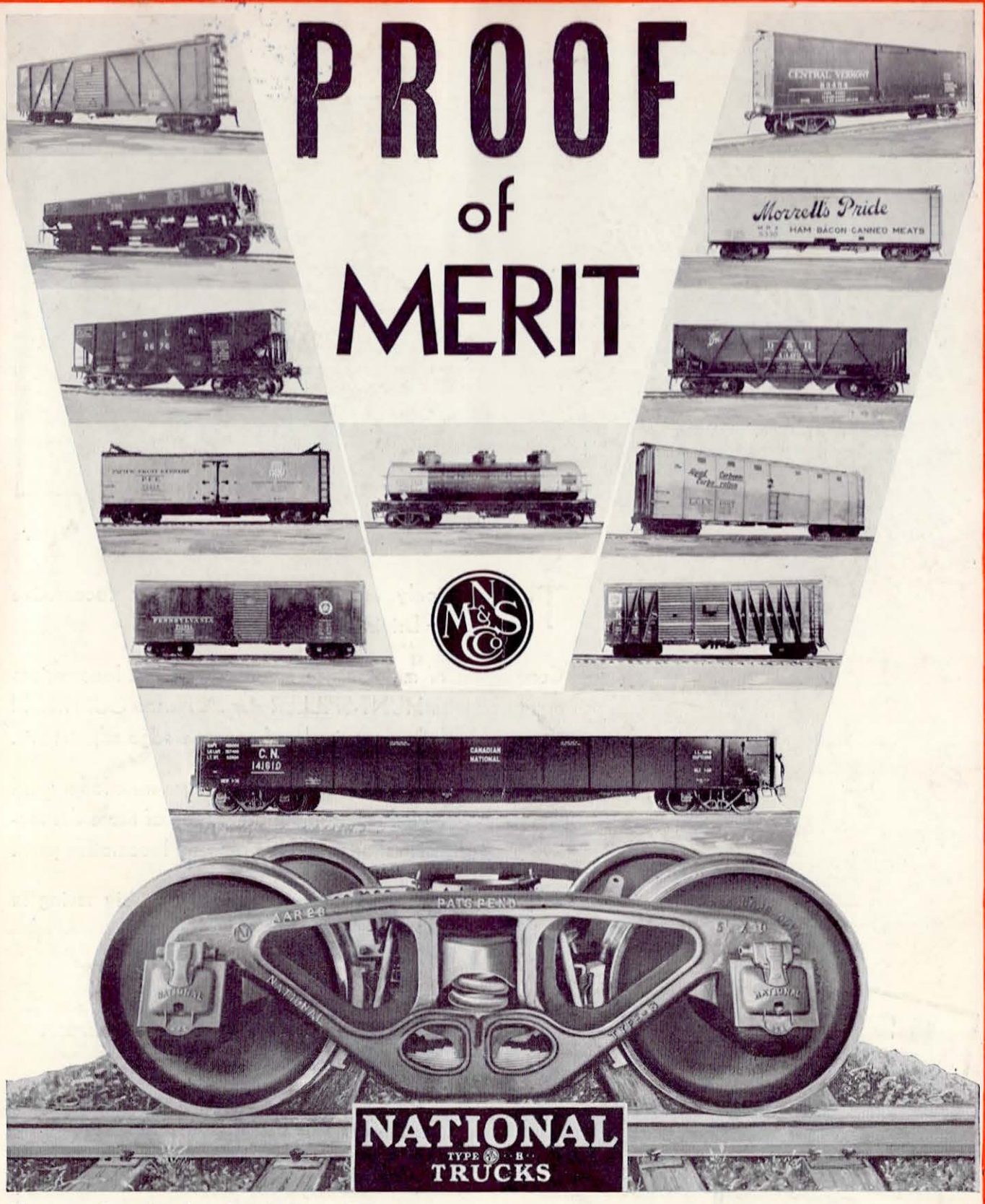

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